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WORKING PLAN

FOR

THE KAMARAJAR DIVISION

1st April 1987 *to* 31*st March* 1997.

PART I, II, AND APPENDICES.

BY

Thiru R. ANNAMALAI, I.F.S.,
DEPUTY CONSERVATOR OF FORESTS

UNDER THE DIRECTION OF THE CHIEF CONSERVATOR OF FORESTS

MADRAS-600 006.

Division, Part I & II

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PREFACE.

Revision of the Working Plan for the composite Ramnad Division was taken up by Thiru C. R. Thirumoorthy in the year 1984 and the Reconnaissance Report written by Thiru C.R. Thirumoorthy was discussed at Madurai, on 19th April 1985. I participated in the Reconnaissance Report discussion. The approved minutes of the Reconnaissance Report discussion was communicated in Chief Conservator of Forest's reference number T1/49311/84, dated 12th May 1985.

The composite Ramnad Division was bifurcated into Pasumpon Muthuramalingam-*cum*-Ramnad Forest Division and Kamarajar Forest Division. This bifurcation was necessitated because of the trifurcation of the erstwhile composite Ramnad District into Ramnad District, Pasumpon Muthuramalingam District and Kamarajar District. This Working Plan is the first one for the newly constituted Kamarajar Division. As there is a proposal to constitute a Meghamalai Sanctuary which will inculde almost the entire area of this tract, Wild Life management and preservation of the existing forest eco-systems are given importance in this plan. In order to enlist the co-operation of the local people for Wild Life preservation, a conscious effort has to be made to meet the energy wood and pastoral needs of the local poor, and accordingly silvipasture and energy wood working circles have been prescribed. Other working circles constituted include the Sandal and M.F.P., overlapping working circles in addition to the Teak and Matchwood non-overlapping working circle.

This plan has been written in accordance with the minutes of the Reconnaissance Report discussion communicated by the Chief Conservator of Forests; certain changes have been made in the constitution of working circles in pursuance of the discussion that I had with Thiru Kondas, I.F.S., Chief Conservator of Forests, Thiru S. John, Joseph I.F.S., Chief Conservator of Forests and Thiru J.C. Kala, I.F.S., Conservator of Forests, Madurai. This Working Plan preparation works were commenced in the month of April 1986 and completed in the month of December 1986. As I was holding Additional Charge of the Madurai Working Plan Division (in 1985) which was engaged in the preparation of working plan for the composite Ramnad Division, I had the benefit of inspecting these areas even before commencing the plan preparation works of Kamarajar Division.

I was assisted by the totally dedicated and highly sincere Rangers and Foresters. They include Thiru G. Nagasamy and Thiru M. Govindan, Rangers and the Foresters are Thiruvalargal A. Charles Stephen, S. Chandrasekaran, L. Amoose, D. Nesamoney and R. Venkatachalam. I was guided by Thiru K. Viswanathan, I.F.S., Conservator of Forests, Working Plan Circle, Tiruchy in preparation of this plan.

R. ANNAMALAI, *I.F.S.*,
Deputy Conservatar of Forests,

CONTENTS

PART—I

CHAPTER-I—THE TRACT DEALT WITH

Sections.		PAGES
1.	Name and situation	1
2.	Configuration of the ground	1
3.	Geology, rock and soil	1—2
4.	Climate and rain-fall	2
5.	Water supply	2
6.	Distribution and area	3
7.	State of boundaries	3
8.	Local status	3
9.	Rights and concessions	3

CHAPTER-II—THE FORESTS.

1.	Composition and condition of the crop...	4—6
2.	Injuries to which the crop is liable	7—10
3.	Fauna	11—19

CHAPTER-III— UTILISATION OF THE PRODUCE.

1.	Forest based industries	20—23
2.	Agricultural customs and wants of the population	24—27
3.	Markets and Marketable products	27
4.	Lines of export	27
5.	Methods ofexploitation and their costs	27

CHAPTER-IV—STAFF AND LABOUR SUPPLY.

1.	Staff.	28—29
2.	Labour supply	30

CHAPTER-V—PAST SYSTEMS OF MANAGEMENT

Sections.		Pages
1.	Political History	31—33
2.	Administrative History of the Forest	33—34
3.	History of the period of working plan	34—35
4.	Results of past management	35—37
5.	Special works of improvements	37
6.	Past-Yield	38

CHAPTER-VI—STATISTICS OF GROWTH AND YIELD. 39—41

CHAPTER-VII—CAPITAL VALUE OF THE FORESTS. 42—44

PART-II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER-VIII—BASIS OF PROPOSALS.

1.	General object of management	45
2.	Working circles, their area and distribution	46—47
3.	Period of working plan	47

CHAPTER-XI—ECO-PRESERVATION WORKING CIRCLE.

1.	General constitution of working cricle and character of vegetation.	48
2.	Division of the area	48
3.	Method of treatment	48
4.	Control	49
5.	Other regulations	49

CHAPTER-X—WILD LIFE HABIT AT IMPROVEMENT WORKING CIRCLE.

1.	General constitution of the working circle and character of the vegetation	50
2.	Division of area	50
3.	Grizzled giant squirrel	50—53
4.	Malabar squirrel	53
5.	Elephant habitant improvement	53
6.	Nilgiri Tahr habitat improvement	53

Sections. PAGES

CHAPTER-XI—WATER SHED MANAGEMENT WORKING CIRCLE.

1.	General constitution of working circle and character of vegetation.	54—56
2.	Division of the area	56—57
3.	Method to be adopted	57
4.	Control	57—58

CHAPTER-XII—ENERGY WOOD WORKING CIRCLE.

1.	General constitution of working circle and character of vegetation.	59
2.	Division of the area	59
3.	Method of treatment	59
4.	Control	60—61

CHAPTER-XIII—TEAK PLANTATION WORKING CIRCLE.

1.	General constitution of working circle and character of vegetation.	62
2.	Division of the area	62
3.	Analysis and valuation of the crop	62—63
4.	Method of treatment	63—64

CHAPTER-XIV—MATCHWOOD PLANTATION WORKING CIRCLE.

1	General constitution of working circle and character of vegetation.	65
2	Division of the area	65
3	Analysis and valuation of the crop	65
4	Method of treatment	65—66

CHAPTER-XV—SILVIPASTURE WORKING CIRCLE.

1.	General constitution of working circle and character of vegetation.	67
2.	Division of the area	67
3.	Method of treatment	67—69
4.	Grazing permits	69—70
5.	Control	70

Sections. PAGES

CHAPTER-XVI—SANDALWOOD OVERLAPPING WORKING CIRCLE.

1. General constitution of working circle and character of vegetation. 71
2. Blocks and compartments 71
3. Analysis and valuation of the crop 71
4. Method of treatment .. .. 71—72

CHAPTER-XVII—MINOR FOREST PRODUCE WORKING CIRCLE.

1. General constitution of working circle and character of vegetation. 73
2. Division of the area 73
3. Analysis and valuation of the crop 74
4. Methods of treatment 75
5. Control 75
6. Other regulations 75

CHAPTER-XVIII—MISCELLANEOUS REGULATIONS.

1. Palmyrah planting 76
2. Agave planting 76
3. R. F. Boundary maintenance 76
4. Bridle path maintenance 76
5. D.P.A.P. Works 76
6. Fire-protection 76
7. Building maintenance 76
8. Installation of rain-guage 76
9. Patta Sandal 76
10. Form Forestry 76
11. Control 77

CHAPTER-XIX—ESTABLISHMENT AND LABOUR.

1. Establishment 77
2. Labour 77

CHAPTER-XX—FINANCIAL FORECAST AND COST OF THE WORKING PLAN.

1. Cost of working plan 77
2. Financial forecast .. .. 78—79

CHAPTER-XXI—SUMMARY OF PRESCRIPTIONS. 79—82

PART III

Appendices .. .. 83—133

PART—I.

SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED.

CHAPTER—I.

THE TRACT DEALT WITH.

Section 1—Name and situation.

1.1.1. *Name of the Working Plan* :

Working Plan for Kamarajar Forest Division. This division is formed after the trifurcation of erstwhile Ramanathapuram District into three districts. Viz.,

1. Ramanathapuram district with Headquarters at Ramanathapuram,

2. Pasumpon Muthuramalingam district with headquarters at Sivaganga and;

3. Kamarajar District with Headquarters at Virudhunagar.

and as a result of the bifurcation of the composite Ramanathapuram Forest Division into two forest Divisions viz (1) Ramanathapuram-Cum-Pasumpon Muthuramalingam Forest Division with headquarters at Sivaganga and (2) Kamarajar Forest Division with headquarters at Virudhunagar as per orders issued in G.O. Ms. No. 866 Forests and Fisheries Department, dated 5th September 1985 and this division started functioning from 27th September 1985 onwards.

1.1.2. *Jurisdiction* :

The entire Kamarajar Revenue District consisting Srivilliputhur, Rajapalayam, Sattur, Virudhunagar, Aruppukkottai and Thiruchuli Taluks.

1.1.3. *Headquarters of the Division* :

Virudhunagar.

1.1.4. *Situation* :

North latitude :—9° 10'—9° —50'

East longitude : 77° 25'—78° —30

1.1.5. *Circle* :

Madurai Circle.

1.1.6. *Ranges*: The division consists of 4 territorial ranges with headquarters at Srivilliputhur, Rajapalayam, Pudupatty and Seithur. Another Range with headquarters at Srivilliputhur is functioning for Wild Life Protection.

1.1.7. *Scope of this plan* : This plan deals with Reserved Forests and Reserved Lands within the Kamarajar Forest Division. The works of other social Forestry Division is excluded from the purview of this plan.

1.1.8.—*The period of this plan.*—1987—88 to 1996—97.

Section 2—Configuration of the ground.

1.2.1. *Western Ghats*: The tract dealt with includes mainly the eastern slopes of the Western Ghats in the Srivilliputhur and Rajapalayam Taluks which includes the Srivilliputhur R.F. and Seithur R.L. The Eastern slopes of the Western Ghats (Srivilliputhur R.F.,) start from the northern most point along the boundary between Kamarajar and Madurai Districts and proceed Southwards in an unbroken line as far as Deviar, at approximately an average elevation of 1,500 metres. Some of the Chief peaks are—

1. Palavarangimottai	..	2012.90
2. Thirunatteri mottai	..	1757.80
3. Panjanthagimottai	..	1753.20
4. Pemalai mottai		1699.30m
5. Vilakku Moongi mottai		1683.70
6. Seithur hillpeak-N.A...		

There are many small isolated hillocks namely Sappaniparambu, Valaikulam parambu, Kothankulam, Kollankondon interpersed in the plains area of Srivilliputhur and Rajapalayam Taluks.

1.2.2. *Hydrology*: The general drainage of the land is towards east to Bay of Bengal, and as such all the rivers and streams drain into Bay of Bengal. There are no perennial rivers in Kamarajar District. The Arjuna Nadhi, Mudangiar and Sevalperiaru are the three main streams. All of them are ephemeral streams. Mudangiar is the drainage channel of Srivilliputhur Taluk. There are many other small ephemeral rivers such as Periar, Chithar, Manganatar, Athithondiyar, Manamekkiar, Pirakudiar and Nagaraiar. They most by feed the innumerable tanks along their meandering course and subsequently join together to form the Vaippar River which flows in a southern-easterly direction and enter Thirunelveli District South East of Sattur. The catch ment area for all the streams are the Srivilliputhur and Seithur Forests.

Section 3—Geology rock and soil.

1.3.1. *Geology* :

This district comprise of ancient crystalline rocks (Archaeans) which are among the oldest formation in the world.

1.3.2. *Rock* :

Crystaline limestones and graphite are among the valuable minerals found in these rocks. This district is mainly covered by black loamy soil which is suitable for growing cotton, chillies and millets. The calcareous nodules (Kan kar) found in this soft clayey soil is probably due to the limestones bonds occuring among the Archaean bedrocks. It is believed that the black colour is due to rich humus content rather than its lime content. The sedimentary rocks are covered by a capping of hard red laterite.

1.3.3. *Soil* :

The pale red loamy soil locally known as 'Seval' is found along the foot of the ghats. Some of the best natural teak forest of this Division—Ayyanar Koil fuel series, Seithur Ex-estate forests etc., are to be found on this type of soil. Along riverbanks alluvial deposits which is of grey or pale brown in colour are found : the depth and extent varies from place to place. It is usually clothed with good growth of semi evergreen forest species. The Alagarkoil valley is a typical example. In the top one third portion of the entire strentch, there is no appreciable depth of soil, and mostly they are rocky in nature. Deep soil is found only in foot hills and all along the river course :

Section : 4 Climate and Rain fall.

1.4.1. *Climatic type.* The upper slopes of Srivilliputhur is coller and damper through out the year. In plains and on the lower foot hills it is generally hot and dry. Tropical claimte prevails over the entire districts except in the shola forest areas.

1.4.2. *Influencing factors.*—The latiude incombination with altitude decides the climate of the tract. Even though the general climate is tropical, as the elevation increases along the slopes of the Western Ghats the climate becomes cooler and damper where the shola forests occur.

1.4.3. *Rain fall* :

(i) Monsoon :—This area receives rainfall both from the south west and north east monsoons. However the bulk quantity of rain is received from the North east monsoon.

(ii) Normal annual rainfall (m m).	1. State : 942.8.
	2. Kamarajar district :
	(i) Watrap 910.4
	(ii) Srivilliputhur 861.5
	(iii) Sivakasi 770.5
	(iv) Virudhunagar 638.0
	(v) Sattur .. 725.9.

1.4.4. *Special remarks drought* :

Drought is a recurring feature in this Division, which badly affects not only the fresh regeneration areas but also the standing growth in the plantations. This district is a drought prone area and the centrally sponsored Drought prone area programme is being implemented in this District.

The following details are furnished in the Appendices IV and XIX :—

1. Statement showing the normal Rainfall data in m m in the various stations in Kamarajar Division. Appendix IV.

2. Statement showing the normal number of rainy days of various stations in Kamarajar Division—Appendies IV.

3. Temperature details—Appendix XIX.

4. Humidity details—Appendicx XIX.

Section 5—Water Supply.

1.5.1. *Surface : Water* :

(i) Rivers. The various river systems that are found in this division are enumerated in paragraph 1.2.3.

(ii) Tanks. There are number of tanks big and small in which rain water is collected and stored during monsoon season for domestic use, irrigation and supplying springs that feed wells. One of the most polluted tanks in Tamil Nadu lies in the Avudayapuram village. The entire village is suffering from incurable diseases including polio, because of the pollution of this tank which serves as drinking water source.

1.5.2. *Ground water* :

Well.—This district is one of the drought prone areas and the ground water goes very deep during summer and during drought periods as observed during 1985-86. The fundamental principle in exploitting ground water is that the amount of water likely to be re-charged in a year can be pumped out. If more water is pumped out, it will affect the hydrological cycle. One of the means of augmenting ground water storage is to construct the percolation ponds, checkdams and other structures which will prevent the runoff thereby increasing the 'opportune time' for infiltration and percolation.

1.5.3. *Forests and water Supply.* The urban centres of Rajapalayam and Srivilliputhur are fully dependant on the forests for water supply. In fact the entire water supply system is dependant on the surface water potential of the forests which is tapped right inside the forest are. In the case of Srivilliputhur, the water supply is mostly Srivilliputhur, the water supply is mostly by extracting the underground water from the dry river beds adjoining the reserved forest. The observations of Thiru S. Kondas, I.F.S., Chief Conservator of Forests, on his field inspections in Thirunelveli and Kamarajar Divisions are given in the Appendix (Ref No. J2/71259/86) Inspection notes No. 5/86, dated 8th August 1986) which illustrate the water supply position clearly. There are many small streams and rivulets that come down from the Western Ghat of Srivilliputhur R.F. Even though the flow in these streams and rivulets are uncertain and incalculable they feed the wells and tanks adjoining the foothill

vudangiayr is tapped at Ayyanarkoil for drinking water supply to Rajapalayam. These forests are to be given much importance from the point of view of watershed management.

Section 6 :—Distribution and area.

1.6.1. *Total Forest area.*—As on 1st April 1984 there are reserved forests covering an area of 18,911.23 ha. and reserved lands covering an area of 7,234.04 ha., Thus the total area of reserved forest and reserved land is 26,145.27 ha., or 261 Sq.Km.

1.6.2. *Percentage of forest.*

Area.—The total geographical area of Kamarajar District is 4,225.06 Sq.Km., The percentage of the forest area of this division to the total area of this Kamarajar District works out to 6.19 percentage the percentage of the forest area to the total geographical area is far below the recommended level of 33.3 percentage of the geographical area. The state Forest area is about 22 percentage. This clearly shows that the present 6.19 percentage is very inadequate the below the level of state and national averages, and has to be expanded by social forestry and farm forestry.

1.6.3. *Percentage forest area.*—The 4,225.06 Sq. Km. of Kamarajar District supports a population of 13,39217 persons (1981 Census). The per capita forest area of this Divisions works out to 0.32 ha, (1981). The man land ratio and man-forest land ratio is bound to decrease in the future as the population increases and the forest area is bound to shrink.

1.6.4. *Distribution pattern.*—The main and the largest R.F., in this Division is the Srivilliputhur R.F. The other R.F., are small in extent and all the R.Fs., are lying within two taluks namely Srivilliputhur and Rajapalayam. The only R.L., Seithur for which 16 notification is under processing lies as a continuous stretch along with Srivilliputhur R.F. The entire portion lies in Rajapalayam Taluk.

1.6.5. *Contiguous Blocks,*—Srivilliputhur R.F., and Seithur R.L., form a contiguous block. The other R.Fs. namely Sappaniparambu, Valaikulam parambu Kothankulam and Kollangondon are found scattered in small individual blocks.

1.6.6. The following details are furnished in Appendices ;—

1. List of R.Fs., in chronological order of notification Appendix I.

2. Range-wise list of RFs. and R.Ls. with area abstract. Appendix I, II and III.

3. Taluk-wise abstract of forest area.

4. Panchayat-wise-Blockwise abstract of forest area.

5. R.Fs. with details if adjuscent dependant villages.

6. Details of present sections and beat arrangements (Appendix III).

Section 7 —State of Boundaries.

1.7.1. *Boundary of the Division.*—The revised boundary description of the Kamarajar Division is the same as that of the Kamarajar District as ordered in the G. O. Ms. No 1122, Revenue, dated 6th July 1984.

Boundary Description.—

North.—Pasumpon Muthuramalingam and Madurai Dirtrict.

East.—Pasumpon Muthuramalingam District.

South.—Thirunelveli District.

West.—Kerala State.

1.7.2. *R.F.Boundary.*—The boundary of the R.Fs. are already demarcated with cairns.

1.7.3. *R.L. Boundary.*—The only R.L., in this division is the Seithur R.L. For this R.L. 16 notification proposal has been sent to the Government and is under processing.

1.7.4. *Boundary maintenance.*—The boundary of all the R.Fs. are being maintained by the department, though not in a satisfactory manner.

1.7.5. *Interstate boundary.*—The list of R.F and R.L., sharing the interstate boundary with Kerala State are Srivilliputhur R.F. and Seither R.L.,

1.7.6. *Inter district boundary.* The R.F., sharing the Inter district boundary with Madurai District is Srivilliputtur R.F.

1.7.7. *Interforest Boundary.*—The R.F., & R.L., which forms a contigous block and share common boundary are Srivilliputhur R.F., and the Seithur R.L.,

1.7.8. *Cairn details.* The details of the position of cairns and the length of the boundaries of the various R.Fs. and R.L., are furnished in Appendix No. I and No, II.

Section 8 —Local Status.

1.8.1. *Reserved Forests* :—There are 26 reserved forests (List given in the appendix). All of them are the absolute property of the state. The section 16 notification declaring them as reserved forests are recorded in the register of reserves maintained in the District Forest Office.

1.8.2. *Reserved Land.*—There is only one reserve land namely the Seithur R.L., which is in the final stage of section 16 notification.

Section 9 —Rights and concessions.

1.9.1. *Reserved forests.*—The rights and concessions in the reserved forests have been furnished in the respective 16 notification for each reserve forest which has been recorded in the registered of reserves maintained in the District Forest Officer. The concessions given after the 16 notification by the Chief Conservator of Forests are also furnished in the register of reserved forests maintained in the District Forest Office. Appendix No. XVIII.

CHAPTER 2,

THE FORESTS.

Section. 1—Composition and condition of the crop.

2.1.1. The following five forests types can be recognised in the S.ivilliputhur R.F., Seithur R. L., complex classification is based on the revised classification of forest types by Champion and Seth 1968).

1. 1A/C4 West Coast tropical evergreen forest.
2. 2A/C2 West Coast Semi evergreen forest.
3. 5A/C1 Dry Teak forest.
4. 5A/03 Southern Mixed deciduous forest.
5. O/Ds. 4 Dry grass land.

2.1.2. 1A/C4 West Coast Tropical ever green forest (concordant with i a/ C3/Western Tropical evergreen forests).

In the S.ivilliputhur Reserved Forests, near about the Kerala boundary there are a number of isolated patches of sholas, their area carrying from about 30 ha. to 150 ha. They occur (amidst) grass land in sheltered valleys or hugging the eastern and Western slopes and are discontinuous. As these areas are in the rain shadowed region of the Western Ghats, the growth is generally poor, comparatively of poor height and density and do not exhibit always the multi storeyed characteristics. The height of the dominats in patches distributed among ridges seldom exceed 18 metres. The Sholas bordering streams on the protected inner slopes, trees reach heights around 30 meters.

2.1.3. Most of the Sholas of the Seithur ex-zamin forests adjoining Srivilliputhur Reserved Forest have been assigned for cardamom cultivation, before the abolition of Zamin. The Cardamom cultivators who are generally from Rajapalayam have well established plantations. These forests are mostly very steep when compared with other areas.

2.1.4. The principal components of the type are :

I. *Acrocarpus fraxinifolious*
Cullenia excelsa
Vitex altissima
Tonna ciliata
Mesua ferrea (Linn).
Syzygium c.minii (Linn).
Dichopsis (elliptica)
Maggi era indica (Linn)
Bischofiaj jaramica

II *Myristica fragrans*
Euphoria longana
Geordonia obtusa
Artocarpus heterophyllus
Agrostachys meeboldii
Cinnamomum zeylanicum

III *Hydnocarpus laurifolia.*
Mallotus philippinensis
Polyalthia fragrans
Diospyros montana.

2.1.5. The undergrowth is dense Solanum species Pandanus, fringing rivolet margins. Laporates crenulata or devil nettle is found along Ferns and orchids are frequent. Pinanga dicksoni and caryota uren are met with 2/A C3. Thirunelveli Semi eve-green Forest (Corcordant with 2 a/C Semi evergreen).

2.1.6. Wher ever the rainfall is over 180 Cm., the elevation over 450 meters we meet a narrow strip of the Semi evergreen type, intermediate, between west coast Tropical described above and deciduous Forests of lower elevations often with exclusive patches, fairly typical of both types. It is characteristic of tracts where moisture is just inadequate for development towards an evergreen climax. This type has both evergreen and diciduous dominates with a closed canopy of inimate mixture with a tendenc to gregarious ocuurence of species like Hopea. Buttressed stems are found in both evergreen and deciduous species Bark generally tend to become rough; The height may go up to 30 metres.

2.1.7. The principal species are :

I *Hopea parvifiora.*
Pterocarpus marsupium
Aglaia roxburghiana
Filicium decipens.
Drypetes venusta
Stereospermum personatum

Dalbergia latifolia
Chukrasia tabularis
Artocarpus heterophyllus

Bischofia javanica
Carallia brachiata

II *Euphora longana*
Diospyros specces

Drypetes Venusta

Syzygium cumini
Litsea species.

Mallotus philippinensis

III *Phelelophyllum kunthianum*

Glycosmis pentaphylla

Helecteres isora

Clerodendrum viscosum

IV *Combretum ovalifolium*

Smilax species

Entada phaseoloides

Ventilago maderaspatana.

2.1.8. 5A/cib Dry teak Forest (concordance with 4a/CI South India dry teak forests).

These types occur in scattered small patches along streams at elevations around 330 metres and more of the areas are found in the Srivillipputhur Reserved Forests and Seithur Ex-zamin Forests between 500 and 1000 metres on slopes. The forests have a good and fairly uniform stocking.

2.1.9. The upper canopy of this climax type is closed through uneven and not dense, formed by a mixture of trees, all of which are deciduous for several months during the dry season. The species found in this type are generally less numerous, exhibit single species crops Though a few species tend to predominate in certain selected area; gregarious character is generally absent. The height seldom exceeds 20 m generally remains at about 15 metres.

2.1.10. The lower canopy also is entirely deciduous though occasional occurrence of evergreens and sub-evergreens in moister and sheltered locales, The annual mean maximum and mean minimum range between 29°C 35°C and 18°C and 23.C with summer temperature reaching 40°C.

2.1.11. Rainfall varies from 900 to 1300 m m ; swallow porus or clayey soils. Teak occurs often in pure patches.

I. Tectona grandis.

Ptero-carpus marsupium

Albizzia lebbek

Albizzia odoratissima

Chloroxylon swietissima

Dalbergia sissoides

Terminalia bellerica

Schleichera oleosa

Stereospermum chelonoides

Pongamia glabra

Sapindus emarginatus

Melia azedarach (Linn)

Careya arborea

Dalbergia Paniculata

Syzygium cumini

Bridelia retusa

II. Absent

2.1.12. Teak generally forms above 40 percent of the percentage increasing on the soil deeep loamy characteristic of the Sirakadu and Ayyankoil and forests. All the existing teak crops is of coppice regeneration and regeneration by coppice appears to be good where as seedling regeneration is little or absent.

2.1.13. This type of forests occurs around Ayyanarkoil of Srivilliputhur Reserved Forest and Sirkadu of Sathur Ex-estate forests Sandal occur in this type of forest in Alagarkoil.

III. **Strobilanthes**

Helecreres isora

Pavetta indica

Mundulea suberosa

Murraya exotica

Glycosmis pentaphylla

IV Acacia intsia

Pterolobium indicum

Atylosia scarabaeoides

2.1.14. 5/DS 4 dry grassland (corcodant with D/Tr.2S/3 Dry Savannah Forest of old classification.

2.1.15. Due to repreated burning of annual fires the type of forests described above in steep hills and slopes have become degraded into a form where only grasses occur with a few solitary fire hard species like, Anogeissus and phoenix persist. This retragressive forest with over running grass was originally described as Savannah type. The canopy is very open and trees are with short bolest usually crooked and hollow.

I. Anogeissus latifolia

Terminalia chebula

Pterocarpus marsupium

Buchanania latifolia

Cymbopogon flexuosus

Careya arborea

Emblica of ficinalis

2.1.16. 5A/C3 Southern mixed Deciduous forest (concorant with 4A/02 South Indian dry mixed Deciduous Forests of first classification). This type of forest is found in the outer most slopes of the western and on the small hill forests, up to an elevation of 90to 150 metres of shallow and well drained hill side or undulating terrain.

1/ii Chloroxylon swietenia

Acacia lecophloea

Acacia planifrons

Albizzia lebek

Albizzia amara

Tectona grandis

Albizzia odoratissima

Morinda tinctoria

Wrightia tinctoria

Givotia rottleriformis

Gyrocarpus jacquini

Protium caudatum

Anogeissus latifolia

Terminalia Chebula

Chochlosperumum gossypium

Pterocarpus marsupium

Dichrostachys cinerea.

Flueggea leucophrus

Gmelina asiatica

Randia dumetorum

Pavette indica

Cassia auriculata

Dodonea viscosa

Climbers

Acacia intsia

Pterolobium indicum

2.1.17. The forests are subjected to annual fires and heavy grazing. Attempts to plant up such forests with miscellaneous forests in Sappaniperambu and Kottangulam were not up to expectations.

CHAPTER 2

Section 2

Injuries to which the crop is liable

2.2.1. *Drought.*—This tract is a drought prone district and constitute a rain shadow region on account of the high slopes of the Western ghats. Drought is a recurring features in this tract which affects firstly the natural regeneration potential secondly the establishment of artificial plantations and thirdly forces the people to destroy more and more vegetation. The partial or total failure of monsoons are common, which adversly affect the regeneration operations. Planting schedule should be made in such a way that the meagre rainfall that comes as a result north east monsoon should be utilised fully to the maximum advantage of the artificial regeneration.

2.2.2. *Wind.*—Hot dry gales sweep the entire tract from June to September in a south-westerly direction. Along the foot of the ghats considerable damage is caused to the seedlings, standing trees, and to the coppice shots. The necessity for carrying out fellings as far as possible against the direction of the wind is indicated. The impetus given by this wind to forest fires is however a greater menace to the ghat forests.

2.2.3. *Fire.*—The fire season in the division extends for 7 months from April to October; fires are mainly confined only to the ghats. The fires are particularly violent as the area does not come under the beneficial influence of south west monsoon. The maximum intensity is from May to August. The primary causative agent for fires is the graziers. The MFP collection contractors also cause fires. The fire not only destroys the vegetation but also seriously affects the endangered Mammalian habitat of Elephants, Nilgiris Tahr and Grizzled giant squirrel. The details of fire occurrence in this division are furnished in the Appendix No. VII, XVIIA.

2.2.4. *Injuries plants.*—Lemon grass (Cymbopogon flexuous). It is highly injuries on account of the enhancefire hazard it poses, its harmful effect in depleting nutri tion and physically obstructing the direct access of trees seeds to the forest floor. It also provides poor quality of humus and excludes the more desirable species of undergrowth, which would enrich the soil and given useful material for burning in regenaration area.

2.2.5. Creepers and Climbers these affect the natural regeneration and coppice growth, thus materially reducing the mean annual increment of the forests. This is particularly noticeable in high moisture areas such as Alakarkoil Valley. The most harmful are Entrolobium Indicum Accacia intsia, Acacia concinna, Acacia pennata and Zizyphus regoisa.

2.2.6. Strobilanthus is an injurious plant in all the moisture areas of the old fuel series of Srivilliputhur R.F., it gregarious habit and its dense rapid growth enable it to cover completely large areas in short periods and thus affect annually seedling and coppice regeneration completely. It is the strong light demander like teak that suffers the most because of this plant.

2.2.7. *Insects.*—The teak defoliator (Hyblaea Pucra) and the teak skeletonizer (Hapalia Machaeralis) are both present in the teak plantations and to a lesser extent in the fuel series containing teak

2.2.8. Lepidopterous defoliator Eligma Narcissus annually defoliates Allanthes excelsa plantations. One method of controlling this pest in the absence of aerial or mechanical spraying of an insecticide when the pest only in cater pillar stage is to annally destroy the pupae by passing a wire or rubbing Hessian cloth vigorously on the stem containing the pupae. The pupae can also be collected manually and buried in the ground.

2.2.9. *Grazing damages.*—One of the primary reasons of degradation of forests is the un-regulated grazing in the forest areas. There is hardly any area except probably the sholas and upper reaches which are free from grazing damages. Grazing adversly affects the natural regeneration and the young recruits. Goat browsing causes severe negative impact on the Forest eco-system. Penning should not be allowed in the hills. Allowing penning of cattle is a clear cut licence for destruction of unique flora and fauna in the upper reaches on the hillocks and also it paves way for the graziers to cause fires in various localities to get a new flush of grasses.

2.2.10. *Man.*—The activities of human being who are indulging in illicit felling, seriously affect the standing crop in most of the places. As the demand for fire wood is very high, more and more trees are being illicity felled by the local people. The teak has disappeared from most of its original home in this tract. For instances the Ayyanarkoil valley which consisted more than 40 per cent of the floral composition in the form of huge teak trees has lost almost the entire lot of teak. Seeing teak is a rare thing now-a-days. Organized smuggling of Sandalwood by the politically powerful individuals and the gangs has resulted in the disappearance of sandalwood in the Alagarkoil Valley. Organised poaching and ineffective control is also leading to the decline in elephant population. Because of the activities of organised gangs there were two instances in which the forest staff were fatally attacked. In one instance one Forest Guard was stabbed to death and in other instance an assistant in the office was stabbed.

2.2.11. *Forest Offences.*—A detailed account the forest offences booked are furnished in the appendix No. V A and B.

2.2.12. A special report on illicit fellings written by Thiru John Joseph, Additional Chief Conservator of Forests (Development and Planning) is furnished below:

AN INVESTIGATION REPORT OF THE ILLICIT FELLINGS IN THE FORESTS ADJOINING SRIVILLIPUTHUR AND RAJAPALAYAM RANGES OF RAMANATHAPURAM DIVISION.

2.2.13. The forests of Srivilliputhur Range and Rajapalayam Range lie on the Eastern slope of Western ghats and contain a hose of valuable timber species and plants and serves as catchment for many east flowing streams These forests together with a belt of plantations of teak and softwood species in the foot hills extent over an area of 26,000 hect. Originally the entire forest area was under executive and administrative charge of a Ranger at Srivilliputhur and due to the exigencies of administration. management, and the need for effective protection in this sensitive area this Range was bifurcated into two Range viz., Srivilliputhur and Rajapalayam with effect from 9th September 1979, more than 50 percent of the forest

areas of the Rajapalayam was ontime the property of Seithur Zamindar and was burdened with right and concessions to which the people living in a string of Zamin Villages at the border of the forests are accustomed to. Even when these areas were notified as reserved land early in 1957 these rights and previlage should not be extinguished because of their enjoyment over centuries. It is sad to note that even today these forests have not been noticed under section 16 and and are under heavy pressure due to the legitimate demands of the people living in those string of villages and also the needs of the large population residing in the twin towns of Srivillipathur and Rajapalayam. In fact the population is well over 2 lakhs and the numerous provately owned depots both in Srivillipathur and Rajapalayam are still catering to the needs of this large population. Recognising this need the current working Plan of this division h had formed 5 fuel series in the forests of this region,namely (1) Pudupatty series. (2) Valaikulam series (3) Seithur series, (4) Ayyanarkoil series and (5) Alagarkoil series to cater to the genuine demands of the people. In 1977-78, the Government took the bold far reaching 9 policy decision to close down fuel working in the forest areas and this had led to a different and unhappy situation where forests remain close to the local people and the people have to device their own ways and means to meet their needs.In fact there was a spate of petitions in 1978-79 asking the Goverament to re-consider this policyas it would amount to starving local population with repect to the fuel needs. The private depots mentioned earlier meet the needs of mid class people to a very limited extent. How they are getting their supplies of fuel and timber regularly for sale is by itself an intersting case to study. The critical fuel situation in this area is also brought out from the fact that the fue is being transported all the way by lorries even from Tiruchirappalli district to these towns.

2.2.14. With this demographic and social scenario prevailing in this region, the protection of this area is a tough and chalenging task considering that these forests like in rugged, undulating terrain with hills rising to an altitude of about 6,000 and 7,000 feet It is an uphill task to the staff to protect such hill forests with numerous outlets/paths and roads leading to the villages and towns. For the purposes of effective field control the two Srivillipathur and Rajapalayam Ranges have been divided into 5 sections 21 beats and thus the 26,000 ha. is there fore controlled by 5 foresters and 21 beat guards Forest guards). People who have been accustomed to cut trees in these forests over decades have not taken to more deceptive and devious way of smuggling and they always play a game of hide and seel with staff and the cut materials are smuggled either by day or night using cycles. The transport to the towns which lie hardly 15 Kms. away from the forests is done either by day or night depending in the vigil and control exercised by local staff. The deteriotating situation is brought out during a surprise inspection carried out by District Forest Officer in broad day light in the month of May 1985 in which he has detected 60 cycles transporting firewood from Reserved **Forests ton the Mudangiar road.**

2.2.15, For one thing the staff is not provided ith either proper quarters or vehicles to enable their uck movement to take preventive action or their voork could not be effectively controlled by a District Forest Officer who is stationed 160 K.m. away. A spate of petitions, telegrams and bit notices about the vulnarability and poor protection of these forests were received both by the Government and the Chief Conservator of Forests during the last 6 to 7 months. But this does not seem to have had the desired effect of impoct on the regional and Divisional Officers iu improving their perceptions and attitude tn device special steps and mesures to combat the situation. The perusal of the diaries of the District Forest Officer for the last 10 months reveals that he has devoted only 2 to 3 inspections to this matter of protecteon in this sensitive and vulnerable area. This only shows his failure to show a grasp and understanding of the seriousness and gravity of the matter. In the serveral months he wos there, his time was spent for routine inspections and reserved areas of Forests, attending meeting conducted by Collectors, discussion wiih Conservator of Forests and office inspection etc., The work of his predecessor leaves much he desired and needs to be investigated furthe... The Assistant Conservator of Forests, Forest Protection Spward, Madurai who is to serve as the eyes and ears os the Conservator of Forests, Madurai has also not devoted adeqate attention to this protection work. In fact in last 14 month he held charge of this posi, he has just spent about 25 days on tour in this sensitive region whereas he should have spent a minimum of 40 to 50 days to have had any impact and to bring the problem under control. I also gathered that the intensive patrol of the Assistant Conservator of Forests Forest protection squad during last 2 mooths in this region has had a very salutory effect and the local staff were telling that the activities of smugglers are very much under control, After my inspection of depots of Rajapalayam private depots on 20-8-85, the Assistant Conserxator of of Forests had also raided depots on the very same day and collected a C fees of Rs. 15,000/-.

2.2.16. The problem has also become politically sensitive and the local M.L.A., Thamaraikani, the Ex-M.L.A., The secretary A.D.M.K., of the Seithur and the Union President Rajapalayam gave all sent signed petitions both to Hon'ble Minister and Government complaining about the poor protection and connivance of the staff. On one such petition, the Assistant Conservator of Forests, Mobile Party has done investigation and it was fonnd that the Rajapalayam Ranger, Thiru Kanakaraj under the prextext of clearing a degraded forests for regeneration work had selected an area having beuce stocking of teak stools supporting a pole crop. The District Forest Officer also had inadvertatly given his approval of this uproatal of stumps and the Renger on his own authority hab given the area nnofficially to 8 local contractors at the rate of Rs. 5000/- per hect. Thus an amount of Rs 40,000- has not been brought to account thereby defrauding the Government Severe action will have to be taken against this Ranger. I have inspected this area and I found that this area contains teak of poor qualitp by the stools with root measuring a meter had been uprooted and disposed off. Each ha., is estimated to give about 30 to 40 tonnes of fuel wood and over the 20.0 ha., uprooted the loss of revenue to Gdvernment is estimated to be Rs.1 to 1.5 lakhs.

2.2.17. Numerous teak fellings are found in the teak plantations taised in the Deviar beat between the years 1956 and 1961. The number of fellings and the damage and loss to Government is to be estimated and is being done.

2.2.18. I was also told that one Ranger, Thiru Chinnakaman who was working social forestry, Virudhunagar was also actively engaging himself in smuggling of timber from this forest. Investigations reveal that a lorry transporting Vengai are dressed timber was booked at Theni by local forest staff and the booked case is reported to be compounded for Rs. 42,000, The interesting fact is that this lorry was drived by his own son and I presume the lorry was driven by his own son and I presume the lorry belongs to the Ranger. This matter requires pursuant action.

2.2.19. The last 1½ years several special parties were organised to list out feellings in Rajapalayam Range. The names of parties and number of felling that were listed out by each party is given hereunder:

I Forest Protection Squad under Assistant Conservator of Forests.

Place : Deviar Beat

Number of fellings : 181

II. Forest Protection squad under Assistant Conservator of Forests.

Place : Navaloothu beat

Number of fellings : 154.

III. Forest Protection Squad under Assistant Conservator of Forests.

Place : Pulpathy beat

Number of fellings : 429

IV. Special District Party.

IV. Special District Party

Place Rajamparai beat

Number of fellings 52

VI. Special District Party

Place : Pravadiar beat

Number of fellings : 78

Kodaikkanal Assistant Conservator of Forests party

(i) Place : Rajampalayam Range

Number of fellings : 1,439

(ii) Place : Rajampalayam Range

Number of fellings : 132

VIII. District Forests Officer's Party

Place : Paravadiar Beat

Number of fellings : 23

IX. Forest Protection squad under Assistant Conservator of Forests.

Place : Pravadiar beat.

Number of fellings : 1200

X. Settlement Ranger party.

Number of fellings : 300

2.2.20. It would be seen that nearly 4,140 fellings of timber trees have been already listed out so far based on these investigation 45 subordinates have been charge sheeted out of 45 numbers of the staff charge sheeted two have been already removed from service.

2.2.21. Mere suspension of staff followed by disciplinary action leading even to the removal can provide only at best temporary solution to this long standing and complex problem.

We have to search for a viable and lasting remedies to this problem so that these vulnerable areas as supporting a fragile eco-system does not receive further set back due to demographic economic and social pressures.

2.2.22. The Ramnad Forest Division extends over thee entire the rest while Ramanathapuram District which is now now trifurcated into 3 revenue districts. It is impossible for one District Forest Officer to effectively manage the scattered and farflung forest areas of this division, the bulk of which lie on the Western Ghats. There is a case for shifting the headquarters of District Forest Officer to Rajapalayam so that he is close to the scene of problem, enabling him to involve himself in its management and protection. The Range Officer who is now in Rajapalayam Town may be immediately shifted to the staff colony in Mudangiar which then sevre as a check post on this road. Now none of the quarters in this colony is occupied by staff and it has become easy for smugglers to to cut and transports pilfered forest produce through this atery road from Forest to Rajapalayam. The shifting of Range Office to Mudangiar which is 4 Kms. from Raja palayam and occupation of staff quarters by the Foresters and beat staff will provide round the check vigil on the main smuggling route.

2.2.23. The complex job of protection of these areas is approached ina most adhoc and unsystematic manner. There is no intelligence available about routes made use of by people who smuggle fuel and timbermeans and methods an what steps and measures are to be taken to combat and control this problemwith the available limited staff and resources. An actual plan based on this information and intelligence prepared withmap etc., will go a long way to towards optimsing protection work and will serve as an effective aid towards improving operational efficiency.

2.2.24. The existing infrastructure and facilities needs also to be strengthened to effectively aid the staff for better performance. In this difficult and challenging area a strike force consisting of a Ranger 2 foresters and 5 forest Guards can be placed directly under the District Forest Officer to serve as an additional arm for protection work. Besides the territorial Rangers may be given at least one jeep and their offices provided with telephones.

Sandal smuggling and elephant poaching cases have also been detected in the past and to forestall such aticvities effective communication is essential. The existing systems, need to be revamped by quick and modern communi, cation facilities, vehicles, checkpost at Appalraj Urani-etc.

2.2.25. It is rather strange that even after 25 years the process of settlement in this area has not been completed and is dragging on for flimsy reasons. This has a direct bearing on control and management of these areas. Two sensitive legislations which will have a far reaching effect and will clamp down rigid protection in the forest area in this region area are also on the anvil. One seeks to regulate the possession of the scheudled timber under proposed section 35 and 36 of Tamil Nadu Forest Act 1882 and the other aims at checking the possession and movement of timber and fuel at private depots under a proposed sec. 35 and 36 of Tamil Nadu Forest Act, 1882. Government should realise the importance of this legislation in the context of changing rural scenereo and legislatious action to enact them.

2.2.26. An information gathering system through information is not employed in forest department of Tamil nadu though such system is existing in Karnatak and Kerala. The District Forest Officer was complaining that numerous persons are willing to give information on payment of a sum of money which may lead to detection of valuable cases but he is not able to avail of their-services. It is high time that Government is moved to authorise District Forest Officers Working in a few stratagic areas to operate this secret fund to secure valuable information for this telephone link to District Forest Officer's residence is essential and may be provided.

2.2.27 All such measures are directed towards preventing and detection of cases by strengthening out protection system but this alone will not find abiding solutions and remedies to this intricate social problem. The problem is basically one of demand and supply and hence the bonafide needs of people for fuel are to be met by alternate means. The depots and sale points in towns are now facing a fuel shortage. It is the normal responsibility of Government to transport and sell fuelwood at competitive prices through to retail outlets to relieve this fuel scarcity.

2.2.28. The extensive teak and softwood plantations at the foot hills of the ghats are now subject to illicit fellings and also are kept under a very low productivity due to the unsuitability of this area for teak.

2.2.29. Skirting the ex-zamin forests there are a series of privately owned forests extending over a sizable exent, of 3,000 hectares which is under poor system of management. These forests are similar to the Zamin forests taken over by Government and contain copies growth of teak worked on a short simple coppice rotation of 5 years. Its production is very low and this is also subject to pilfering and smuggling by local popuection. Either these forests can be taken over or notified under Tamilnadu presrvatieon of private Forest Act or should be brought under optimal productivity to meet local demands by drawing up suitable programme in collobaration with banking institutions (as finance is major constraint ot the owners of this land) for its reforestatio) with quick growing species and mangement. This will go a long way to mitigate the local scarcity and bring down the pressure on Government forests.

SECTION 3

Fauna

2.3.1. Srivilliputhur R.F. and Seithur R.L. support a variety of Fauna and Flora in the natural forest eco-systems. Some of the Fauna are unique to the Western Ghats; namely Nilgiris Tahr, Lion taied Macaque and the grizzled giant squirrel. This tract supports some of the other endangered species like the elephants, the Indian Bison, tiger leopard, etc. A private Wild Life Organisation is taking up the cause of Wild Life Conservation in Kamarajar Distric There is a separate Wild Life range functioning in the present Kamarajar Division. There is a proposal to constitute Megamalai sanctuary which will include the entire tract of the Kamarajar Division. The list of mammals found in the Kamarajar District is furnished below—

Zoological name.	*Common name.*
(1)	(2)
1. Macaca radiata, Geoffroy	The Bonnet Macaque.
2. Wrasbytis entellus, Dufrense	The Common Langur or Hanuman Monkey.
3. Presbytis johini, Fischer	The Nilgiri Langur
4. Loris tardigradus, Linnaeus	The slender Loris.
5. Panthera pardus, lineeaeus	The Leopard or Panther
6. Felis chaus Guildenstaedt	The Jungle cat.
7. Viverricula indica Desmarest	The Small Indian Civet.
8. Paradoxurus herma-phroditus, Pallas	The common Palm Civet or Toddy Cat.
9. Herpestes edwardsi, Geoggroy	The common Mangoose.
10. Hyaena hyaena Linnaeus	The striped Hynea
11. Canis aureus Linnaeus	The jackal.
12. Vulpes bengalensis Shaw	The Indian Fox.
13. Cuon alpinus, Pallas	The whole or Indian Wild Dog.
14. Melursus ursinus Shaw	The Sloth Bear.
15. Lutra Lutra Linnaeus	The Common Otter.
16. Paraechinus micropus Blyth	The Pale, Small-fotted or South Indian Hedehog.
17. Pteropus edward	The flyig Fox.
18. Scotophilus heathi	The Common Yellow Bat.
19. Pipistrelle coromandra	The Indian Pipistrelle.
20. Petaurista petaurista phillippensis, Elliot	The Large Brown Flying Squirrel.
21. Petinomys fuscocapillus Jerdon	The small Travancore Flying Squirrel.
22. Ratufa mecroura	The Grizzled Giant squirrel.
23. Ratufa indica, Erxleben	The Indian Giant squirrel.
24. Funambulus palmarum	The Threetriped Palm Squirrel
25. Bandicota indica, Beschstein	The Bandicoot Rat.

26. Hystrix indica, Kerr.	The Indian porcupine.
27. Lepus nigricollis, F. Cuvier	The Indian Hare or blackna ped Hare.
28. Hemitragus hylocrius, Ogilby	The Nilgiris Tahr.
29. Cervus unicolor, Kerr	The Sambar
30. Axis Axis, Erxleben	The Chital or spotted deer.
31. Muntiacus muntijak, Zimmermann	The Muntac/jungle sheep/Ribfaced Deer or Barking Deer.
32. Tragulus meminna, Erxleben	The Indian Chevrotain or Mouse Deer.
33. Sus scrofa Cristatus Wagner	The Indian Wild Boar.
34. Manis Crassicaudata, Grey	The Indian Pongoiin.

2.3.3. The list of Avi fauna found Kamarajar District is furnished below.

Common name. (1)	*Zoological name.* (2)
House Grow	Corvus splendens Vieillot.
2. Jungle crow	Corvus macrorhynchus Wagler.
3. Tree pie	Dendrocitta Vegabunda (Latham)
4. Grey tit.	Parus major Linnaeus.
5. Velvefronted Nuthatch	Sitta frontalis Swainson.
6. Jungle Babler.	Turdoides striatus (Dumont).
7. Common Babbler	Turdoides caudatus (Dummont)
8. Slathyheaded Scimitar Babbler	Pomatorhinus schisticeps Hodgson.
9. Goldfronted Chroppis or Green Bulbul	Chloropsis aurifrons (Temminck)
10. Redvented Bulbul	Pycnonotus cafer (Linnaeus)
11. Pied Bushcat	Sagicola Caprata (Linnaeus)
12 .Collared bushcat	Saxicola torquata (Linnaeus)
13. Indian Robin	Saxicoloides fulicata (Linnaeus)
14. Magpie-Robin	Copsychus saularis (Linnaeus)
15. Shama	Copyschus malabaricus (scopoli)
16. Black bird	Turdusmalabaricus (scopoli)
17. Malabar Whistling Thrush	Myiophoneus horsfieldli (vigors)
18· Paradise Flycatcher	Terpsiphone paradis (Linnaeus)
19. Whitespotted Fantail Flycater	Rhipidura albogularis (Lesson)
20. Grey shrike	Lanius excubitor Linnaeus.
21. Baybacked shrike	Lanius vittatus Valen Ciennes.
22. Scarlet Minivet	Pericrocotus flammeous (Forester)
23. Large Cuckoo-shrike	Coracina novaehollandiae (Gmelin)
24. Black Drongo or King crow	Dicrurus adsimilis (Bechstein)
25. Whitebellied Drongo	Dicrurus caerulescens (Linnaeus)
26. Racket-tailed Drongo	Dicrurus paradiseus (Linnaeus)
27. Tailor Bird	Orthotomus sutorius (pannant)
28. Streaked Fantail Warbler.	Cisticola juncidis (Rafinesque)
29. Golden Oriole	Oriolus oriolus (Linnaeus)
30. Grackel or Hill Myna	Gracula religiosa Linnaeus.
31. Rosy Pastor or Rosecoloured starling	Sturnus reseus (Linnaeus)
32. Brahminy or Black-headed Myna	Sturnur Pag odarum (Gmelin)

Common name.	*Zoological name.*
(1)	(2)
33. Common Myna	Acridotheres tristis (Linnaeus)
34. Common Weaver Bird	Ploceus philippinus (Linnaeus)
35. Whitethroated munia	Lonchura malabarica (Linnaeus)
36. Spotted Munia	Lonchura punctualata (Linnaeus)
37. Blackheaded Munia	Lonchura malacca (Linnaeus)
38. House Sparrow	Passer domesticus (Linnaeus)
39. Redrumped or striated swallow	Hirundo daurica Linnaeus
40. Grey Wagtail	Motacilla caspica (Gmelin)
41. Yellowheaded Wagtail	Motacilla citreola Pallas
42. Indian Pipit	Anithus novaeseelandiae Gmelin.
43. Blackhellied Finch-Lark	Eremopterix grisea (Scopoli)
44. Purple subbird	Nectarinia asiatica (Latham)
45. Purplerumped sunbird.	Nectarinia Zeylonica.
46. Firebreasted Flowerpecker	Dicaeum iginipectus (Blyth)
47. Indian Pitta	Pitta brachyura (Linneus)
48. Common Hawk-Cuckoo or Brainfever bird	Cuclus Varius Vahl
49. Pied Crested Cuckoo	Clamator jacobinus (Boddaert).
50. Koel	Eudynams scolopacea (Linnaeus)
51. Crow-pheasant or Coucal	Centropus sinensis (stephens)
52. Alexandrine, or Large Indian, Parakeet	Psittacula eupatria (Linnaeus)
53. Roseringed parakeet	Psittacula Krameri (Scopoli).
54. Blossomheaded parakeet	Psittacula cyanocephala (Linnaeus)
55. Lorikeet	Loriculus vernalis (Sparrman).
56. Roller or Blue Jay	Coracias benghalensis (Lannaus).
57. Common Green-Bee-eater.	Merops orientalis Latham
58. Pied kingisher	Ceryle rudis (Linnaeus)
59. Common king fisher	Alcedo atthis (Lannaeus)
60. White breasted kingfisher	Halcyon smyrensis (Linnaeus).
61. Common Grey Hornbill	Tockus birostris (Scopoli)
62. Hoopoe	Upupa epops (Linnaeus).
63. House swift	Apus affinis (J.E Grey)
64. Brown Fish owl	Bubu Zeylonensis (Gmelin).

Common name. (1)	Zoological Name. (2)
65. Indian Great Horned owl	Bubo bubo (Linnaeus).
66. Spotted owlet	Athelene brama (Temminck)
67. Whitebacked or Bengal, Vulture	Gyps bengalensis (Gmelin)
68. White scavanger Vulture or pharaoch's chicken	Neophron percnopterus (Linnaeus).
69. Kestrel	Falco Tinnunculus (Linnaeus)
70. Crested serpent Eagle	Spilornis Cheela (Latham)
71. Blue Rock pigeon	Columba livia Gmelin
72. Emerald or Bronzewinged, Dove	Chalcophaps indica (Lanneaus)
73. Common Sandgrouse	Pteroles exustus (Temminck)
74. Common peafowl	Pavo cristatus Linnaeus.
75. Grey junglefowl	Gallus sonneratti (Temminck)
76. Common or grey Quail	Conturnix conturnix (Linnaeus)
77. Painted patridge	Francolinius pictus (Jardine & Selby)
78. Grey partidge	Francolinus pondicreianus (Gemelin)
79. Whitebreasted Watherhen	Amaurornis phoenicurus.
80. Indian Moorhen	Gallinula Chloropus (Linnaeus)
81. Pheasant-tailed Jacana	Hydrophasianus Chiturgus (Scopoli)
82. Stone Curlow	Burhinus oedicnemus.
83. Indian Courser	Cursorius coromandelicus
84. Brownheaded Gull	Larus brunnieephalus
85. River tern	Sterna aurantia
86. Little Ringed plover	Charadrius dibius scopoli
87. Redwattled Lapwing	Vanellus indicus (Boddaert)
88. Blackwinged stilt	Himantopus himantopus (Linnaeus)
89. The Vocet	Recurirostra avosetta (Linnaeus).
90. Curlew	Numenius arquata (Linnaeus).
91. Common sandpiper	Tringa hypoleucos Linnaeus.
92. Spotted billed or grey pelican	Peleeanus philippensis
93. Spoonbill	Platalea leucorodia Linnaeus
94. White Ibis	Threskiornis melanocephala (Latham)
95. Glossy Ibis	Plegadis facinellus.
96. Painted stork	Ibis leucocephalus (Pannant).

Common name (1)	Zoological name (2)
97. Openbilledstork	Anastomus oscitans(Boddaert)
98. Grey heron	Ardea cinerea (Lnnaus))
99. Little egret	Egretta Garzetta (Linnaeus)
100. Cattle egret	Bablcus ibis (Linnaeus)
101. Indian Reef Heron	Egeretta gularis (Bosc)
102. Paddy bird or pond heron	Ardeola grayil (sykes)
103. Night heron	Nycrocorax nycticotax (Linnaeus)
104. Cotton teal	Nettapus coromandelianus (Gemlin)
105. Barheaded Goose.	Anser indicus (Latham).
106. Garganey or Bluewinged Teal	Anas querquedu'a Linnaeus
107. Jungle myna	Aeridotheres fuscus (Wagler)
108. Ashy Wren-Warbler	Prinia Socialis sykes

2.3.4. A short description of some of the mammals found here are furnished in the following paragraphs:—

2.3.5. *Elephants.*—(Elephants maximum Linnneaus) Elephant. the largest land Animal is freely and Seithur R.L., During monsoon periods they come out side the R.F., also. During 1986 one elephant killed a person reported to be teasing it and in an another incident one female elephant died by falling in a ditch; A group of about 5 other elephants which tried to rescur the fallen elephant did not succeed in the ir attempt. In the case of elephants only the males have large tusks. The tusks of females seldom protude. Of late the elephant population is getting reduced in strength because of incrensed poaching for ivory. Currently the Government of India is contemplating to ban Ivory trade to save the elephant population. As the Elephant eco-system is undergoing habitat destruction, the future of elephants can be ensured only by positive intervention in the elephant habitat and by restoring the habitat, wherever it has undergone negative changes.

2.3.6. *The Bonnet Macque.*—(Macaca radiata Geoffroy) is a medium sized, long tailed macaque. A bonnet of hairs rediates in all directions from a whorl on its crown. The hairs cover the forehead, are short and parted in the entre. The coat of the Bonnet Macaque in the cold weather is usually lustrous olive-brown; the underparts whitish and in the hot weather the coat loses its lustre and is a buffy grey. It is found around villages and in open forests.

2.3.7. *The lion tailed macaque.*—(Macaeal silenus, in Linnaeus) can be easily distinguished from all others species or macaques firstly by a great name of long dark grey or brownish grey hairs growing from the temples and checks by its glossy black coat and short tail ending in a tuft. This is endedmic to western ghats. It is found in small troups in shola forests. generally around Majolai, Kakachi, Nalumukku and Sengaltheri forests. It is with the main object to protect and develop this species that Kalakad sanctuary has been formed in Tirunelveli District. This species is reported by found near Madaliaruthu region of the Srivilliputhur R.F. in Kamarajar Division

2.3.8. *The Common Langur or Hanuman Monkey.*—(Presbytis entellus) This is the long limbed, long tailed, black faced monkey seen as much about towns and villages as in forests. Different races are found in the Himalayas, Peninsular and Southern India and Ceylong differing in size, heaviness of coat and details of colour. It is found in the ghat forests wherever Nilgiris Langur is met.

2.3.9. *The Nilgiri Langur.*—(Presbytis Johini (Fischer) This is a glossy black or blackish-brown langur with a yellowish brown head. The rump' and base of tail are grizzled Young are jet black. The Lion-tailed macaque which has almost the same distribution is also black but is distinetive in its shorter tuft ended tail and the heavy facial tuft of long light hairs framing its face. It is found in Kalakad Veerapali, Klamalai forests of Thirunelveli Division. It is also found in Srivilliputhur R.F., This species need's special protection against poaching as there is a belief that its flesh has medicinal value.

2.3.10. *The Gaur, or Indian Bidson.*—(Bison Bos Gaurus Smith) with its huge head, deep massive body and sturdy limbs, the Gaur is easily distinguished. Very striking in the Gaur is the middle of the back where it ends in an abruptdip. A newly born Gaur is a light golden yellow which soon changes to fawn, then to light brown and to coffee or riddish brown, the colour of young bulls and cows. Old bulls are jet black, their bodies almost hairless with ashy forehead and yellowish or white-stockinged feet. It is found in the moist deciduous and shola forests. As per 1984 census there are about 110 bisons in Srivilliputhur R.F.,

2.3.11. *The Nilgiris Tahr.*—(Hemitragus hylocrius. Ogilby). The Nilgiris Tahr short crisp coat. The rounded outer surface of its horns and the presence of only a single pair of teats are distinguishing characters. The general colour of the animal is a dark yellowish brown, 'paler on the under surface. Does and young bucks are grey. With age the bucks get a very deep brown almost black coat with a distinctive light 'Saddle patch' on the lions. From a distance the saddle looks almost white. In build, bucks are far heavier and stockier than the does. The horns are almost in contact at the base, rise parallel for some length, then diverge and curve downwards in a hold sweep and are deeply wrinkled. It is found in precipitous rock faces above 1,200 m altitude especially in the Mudalaruthu, Pemalaimottai, Panjanthangimottai, Palavarangimottai and is surviving mostly because of the inaccessibility of habitat to human beings. However the cattle grazzing and repeated fire that is caused by the graziers are the major factors that are threatening the existence of this unique fauna as per 1984 census there are about 602 Nilgiri tahrs in Srivilliputhur R.F.,

2.3.12. *The grizzled giant squirrels* (Ratufa nacroura) is found in the Alagarkoil, forests in the Western ghats near Srivilliputhur, their only natural habitat in our country. Its present head count stands at only 100 The grizzled giant squirrels are frugivorous and herbivorous. They stay in trees, seldom coming down to the ground and are active at sunrise and sunset, moving the high canopy from tree to tree. But they are yet to be studied elaborately. Almost the same size of the Indian giant squirrels with red nose and lips and black caps on shoulders, they have black foreheads and grey bodies. Thier calls are not audible. They are known to build two nests in January and March—one for nursing their offsprings and other for beeding down. They build on the slender branches of tall trees, sufficiently out of reach of predators.

23.3.13. *Squirrels.*—The large Brown Flying Squirrel petavrista patavrista phyllippensis (Elliot), It has a bright chest-nut or bay coloured coat and salmon-buff under parts. In its summer coat this beautiful squirrel has a bright yellow line down the middle of its deep maroon coat. The body is darker tail black-tipped under parts rufous. They are rare and found in the forests around Kodayar and Sengaltheri.

2.3.14. *The Indian Giant Squirrel* (Ratufa indica)—It has a body one and a half feet long with a tail of 2 feet with deep brown and buff coloured coat. It is very common and found in moist deciduous and shola forests wherever there is continuous aereal routes.

2.3.15. *The Slender Loris.*—(Loris tardisgradys (Linnaeus) is lean and lanky in appearance. The Limbs are longer and slender the ears large. the snout pointed ; the eyes a close-set. The fur is soft and woolly. Its colour varise from dark grey to earthly brown with an enbellishment of

silvery hairs, the lower parts always much paler. The dark spinal strips is never strongly prounced and is some times absent. Eyes are circled with black or dark brown and Muzzle white. It is met with in the Dry mixed deciduous forests and is nocturnal. These are being caught in for the supposed medicinal property they possess.

2.3.16. *Cats* : Tiger (Panthera tigris (Linnaeus). The Indian Tiger is a rich-coloured well-stripped animal with a short coat. Individual variation in colour, stripes and markings are great.

2.3.17. *The Leopared or Panther* : (Panthera Paradus) Linnaeus A Panther Is a sleek short haired animal with fulvous) or bright fulvous coat marked with small close-set black rosettes. There is however considerable colour variation. It is comparatively more common and found all over even frequently forests adjoining crop fields.

2.3.18. *The Jungle cat* (Felis Chus Gujldenstaed) with its long legs and comparatively short tail the Jungle cat has a very distrinctive appearance. It has pale green eyes The colour or its fur various from sandy grey to yellowish grey. The tail is ringed with black towards the end and has a black tip. The paws are pale yellowish, black or sooty bronw underneath. The ears are reddish ending in a small pencil, of black hairs The underside of the body is paler, with vestings of stripes on the underside and flanks. It is not common but found in open type of forests on elevation up to 600 meters.

2.3.19. Civet. The small Indian Civet (Viverricula indica) Desmarest) A tawny grey or greyish brown animal, lined and streaked on black and croup ; spotted more or less in rows along the flanks. There are usually some cross marks on the neck It is a fairly common animal snared in agricultural fields for collecting its execution called 'Punugu.

2.3.20. *C. Mongooses. The common Mangoose* : (Her pestes edwardsi (geoffrou). A tawny yellowish -grey mongoose with no stripe on the side of its neck. The alternate light and dark rings on its hairs gives its coast a grizzled 'pepper and salt' tinge. The tail, which is as long as its body, is tipped with white or yellowish-red, never black. It is very common almost found all over except in sholas and very moist areas.

2.3.21. *The striped necked Mongoose* : (Herpestess Vitticollis) (Bennett). The black-neck-strips reaching backwards from the ear to the shoulder is distinctive in this mongoose. Its coat is grizzled grey, tipped with chestnut-red ,the red increasing, in intensity on the hind-quarters. It shares the same habitat as above but less frequently seen.

2.3.22. *Hyaena-The striped Hyoena* : (Hyaena hyaena) (Linnaus). A dog like build, massive head and fore-body, weak hindquarters, and a heavy dorsal crest of long hairs, sharply defined from the rest of the coat, distinguish the hyena. Its colour varies from cream, buff, or tawny to the grey or dirty white of the harsh scanty summer coat. Tranverse strips on body and limbs are usually well defined. These are the commonest nocturnal scavengers of those forests.

2.3.23. *The Jackal* : (Canis aureus) (Linnaeus). The coat is a mixture of black and white washed with buff about the shoulders, ears and legs. The Jackal's long-drawn eerie howling at dusk or just before dawn is perhaps more familiar to most people, than the animal itself. It is common and found throughout the plain forests.

2.3.24. *The Indian Fox Vulpes bengalensis* : (Shaw) This is a common fox ; a pretty, slender-limbed animal distinctive in the black tip of its tail. The backs of its ears are generally of the same tone as the head and nape. It is less common.

2.3.25. *The Dhole or Indian Wild Dog* : (Cuon alpinus (Pallas). Much like a domestic dog in general appearance, with the long lanky body of the wolf, but relatively shorter in leg and muzzle. Very distinctive is its red coat, which varies in tone with season and locality. Trans Himalayas are a deeper red, in peninsular India the coat takes on a tawnier tinge. It is fairly common. Till recently they were considered as vermin.

2.3.26. *Bear* : *The Sloth Bear* : (Melursus ursinus (Shaw). With its elongated muzzle, and lower lip, long unkempt hair and short hind legs, this is easily distingwishable. Most have a whitish V-shaped breast patch, and usually the muzzle and the tips of the feet are dirty white or yellowish. The claws always longer on the fore-feet are ivory white. The coat may have a brownish tinge, more rarely it is wholly brown. It is found in secluded forests and frequent open forests for feeding.

2.3.27. *Otter—The common Otter* : (Lutra Linnaeus). It has a close coat of water proof fur ; a thick muscular tail, paddle like feet and brizzling rigid whiskers and has acquatic habits ; main food is fish and fishing clubs have declared this as a vermin. It had been shot as it was considered a vermin. They are now found in hill rivers.

2.3.28. *The flying Fox* (*Pteropus gigantens*) : These are the only mammals with wings. Over the framework of arms and hands interfemoral and antebrachial membrane form the wing. These are nocturnal. They are found in the Sengaltheri forests and go out to 3—5 miles during night for feeding.

2.3.29. *The Indian Porcupine* : (Hystrix India Kerr). Porcupines are recognized by their hair, modified into spines. Other rodents have spines, but never so long or formidable. Its neck and shoulders are crowned with a crest of bristles 6 to 12 inches long. The quills on the back are very profuse. Here the under-armature of short thick quills is more or less hidden by a bristling mantle of longer and thinner spines. Each quill is ornamented with deep brown or black and white rings. The white 'Rattling quills' on the tail are large and open. It is very common being nocturnal in habits not seen in the day time but its evidences are common almost everywhere.

2.3.30. *The Indian Hare* : (Lepus nigricollis F.Cuvier). The Black-napped Hare (L.n. nigricollis) is destinctive in having a dark brown or black, patch on the back of its neck from the ears to the shoulder, upper surface of tail is black. It is common and nocturnal. It is most commonly seen by headlights in open grassy areas.

2.3.31. *Deer—The Sambar* (*Cervus unicolor Kerr*): The typical forest deer has coarse and shaggy coat. In stages it forms a mane about the neck and throat. In the hot wheather much of the hair is shed. The general colour is brown with a yellowish or greyish tinge. The underparts are paler. Females are lighter in tone. Old stags tend to become very dark, almost black. The antlers are stout and rugged. The brow tine is set at an acute angle with the beam. At its summit, the beam forks into two nearly equal tines. It is seen in hill forests not uncommon in Kalakad forests.

2.3.32. *The Chital or spotted deer*: (Axis axix) (Erxleben). The Chital is perhaps the most beautiful of all deer. Its coat is bright refous-fawn profusely spotted with white at all ages and in all seasons. Old bucks are more brownish in colour and darker. The lower series of spots on the flanks are arranged in longitudinal rows. It used to be the commonest deer now found only in a few places in the lower slopes of ghats.

The graceful antlers have three tires, a long brow tine set nearly at right angles to the beam and two branch tines at the top. The outer tine, the continuation of the beam is always longer. It may be noted that old bucks often have one or more false points on the brow antler where it joins the main beam.

2.3.33. *The Muntjac or Barking Deer*: (Muntiacus muntiak Zimmermann.) The antlers are small, consisting of a short brow-tine andanunbranched beam and are set on bony hair-covered pedicels which extend down each side of the face as bony ridges, hence name Ribfaced Deer. In does, tufts or bristly hair replace the horns. Old males are browner in colour. The upper canines of the males are well developed and are used by the animal in self-defence. It is seen in moist deciduous and dry deciduous forests.

2.3.34. *The India Chevrotain or Mouse-Deer*: (Tragulus memminna) (Erxleben). The Indian Chevrotain or Mouse-deer is a tiny little creature with very slender limbs and high hindquarters. Because of its small size, shy habits and very protective colouring it easily escapes observation. Its coat is olive brown minutely speckled with yellow. The flanks are marked with rows of buff or white spots which elongate and pass into longitudinal bands. The lower parts are white. The throat has three white stripes. It has a three chambered stomach and tusks. It is more common in the interior valleys and rivulets.

2.3.35. *The Indian Wild Boar*: (Sus Scrofa cristatus Linnaeus). The colour of the animal is black mixed with grey brown and white hairs. The young are browner and old boars greyer. New born wild pigs are brown with light or black stripes. The tushes are well developed in the males. Both the upper and lower tushes curve outwards and project from the mouth. Being prolific it is found in almost all types of forests in ghats.

2.3.36. *The Indian Pangolin*: (Manis Crassicaudata Gray). The most distinctive character of a pangolin is its armour protective scales. The upper part of the head, the back and sides of the body, the whole tail, and the outside of the limbs are covered with large-over-lapping scales. In defence the animals curls itself into an armoured ball, exhibiting an enormous muscular power which defies any ordinary attempt to unroll it. The scales of the pangolin may be regarded as hairs or rather spines enormously enlarged and flattered. It is not generally found but leaves its trails on the forest paths.

CHAPTER III.

UTILIZATION OF THE PRODUCE.

SECTION 1.

Forest Based Industries.

3.1.1. To emcompass only a Revenue District for a discussion on industrial potential and to confine proposals to its limits, would be pointless and incomplete because the flow or raw materials and labour can not be limited within the District bounds. However this assessment may enable a future broad based, state level or zonal survey and proposals.

3.1.2. The non-availability of raw materials in the surrounding region for forest based industries, probably had discoveraged the enterpreners of Chettinad and Rajapalayam from starting any large scale Industry, based on forests inspite of the fact that cheap skilled and semiskilled labour are available in the district.

3.1.3. Cotton dyeing and chank fishery of this District have been well known traditional industries ; Cotton and artificial silk dyeing, Basket weaving using Bamboos, reeds and Palmyrah leaves are common cottage Industries distributed through out the district.Essential oil distillation, tanning, wood carving, toy, tops and comb manufacture and Furniture and Cabinet making are other small and medium sized industries of the District. The Rajapalayam Chipboards Limited and Match Industries in the District are discussed below separately.

Match Industry in Kamarajar District.

3.1.4. The first Match Industry in Ramanathapuram District was started in the year, 1922 with the borrowed knowledge from Calcutta. The object of starting this industry was to provide employment in this economically backward District. Now it has grown into a popular cottage industry as well as a large scale industry. Annual turn over is estimated to be about 2 crores.

3.1.5. The first match factory in India was set up in 1895 in Ahmedabad. Between 1895 and 1920 several small factories were established in different parts of the country. In 1923, Swedish enterprise entered this industry with the establishment of WIMCO (Western India Match Company). A very significant development is the emergence of flourishing cottage manufacturers of matches. Though, they are concentrated in Maharashtra, Tamil Nadu Uttarpradesh, West Bangal and Kerala, in Tamil Nadu the small manufacturers are concentrated in this district and in the adjoining region.

3.1.6. There are two distinct categories of units ; one type is factories making splints and veneers for match sticks and boxes, the other type being engaged in the chemical treatment of match sticks and assembling boxes, known as dipping factories.

3.1.7. The forests of Tamil Nadu does not meet even 5 per cent demands of this Industry. 97.25 per cent of splints and veneers produced in Kerala are sent to Tamil Nadu. The factories get veneers and splints frmo Karnataka also.

3.1.8. The main raw materials required for the match industry are soft wood logs, red phosphorous, pottasium chlorate, sulphur, match paper and glue.

3.1.9. The climate of Sivakasi and surroundings is very much ideal, with minimum rain and humidity ; this region provides the suitable climate due to its very hot weather with a low rainfall of less than 25". As there is not much facility for agriculture, cheap labour is available in plenty and the labourers are hard working. The labourers do not have any other occupation more paying than this, and so the industries numering about 1,080,could use about 4 lakh persons in this region alone.

3.1.10. Most of the labourers are very young ; some of them 5 or 6 years old and each earn between one rupee to 3 rupees per day. There is some health hazard in this occupation because the fumes from the chemicals like phosphorous when heated up, is definitely harmful to the lungs. The workers appear to be happy as it gives them a livelihood when non else is avallable. The work is easy and although monotonous does not strain them. Owners of the factory generally are very considerate and apart from the wages ,give them some bonus or cash awards during the marriages or other functions in the family of the labourers.

3.1.11. In a survey conducted by the industry, it is found that about 2 crores match sticks are used per day.

3.1.12. The industrialists have in these 55 years made a name and are experts in the trade. Industrialists from other states frequently come here for training. Nearly 100 match industries have been opened by the industrialists who have got their training here.

3.1.13. There are rigid specifications regarding colour, handless and smell of matchwood. The following matchwood species are found though in negligible quantities in the forests of Srivilliputhur Reserved Forests.

3.1.14. Bombax ceiba
Canarium strictum
Dysoxylum malabarium
Elaeocarpus tuberculatus.
Evodia roxburghiana
Machillus macrantha
Mangifera indica.
Salmalia malabarica
Spondias mangifera.
Sterculia villosa
Trewia nudiflora.

DETAILS OF MATCHES EXOPORTED FROM WTHE DISTRICT BETWEEN APRIL 1974—MARCH 1975.

	Matches Gross.	*Bengal gross.*	*Match gross.*
(1)	(2)	(3)	(4)
April 1974 ..	16,84,050 4,23,269	60	Export.
May 1974 ..	17,45,645 5,00,618	200	..
June 1974 ..	16,23,346 4,62,924	11,379	....
July 1974 ..	15,67,381 4,27,348	41,743	73,72,800 sticks.
August 1974 ..	16,25,462 5,06,176	66,925	3,36,60,000 sticks.
September 1974.	15,21,299 4,60,636	66,261	14,25,80,160 sticks.
October 1974 ..	15,75,822 4,27,315	50,438	13,46,65,920 sticks.
November 1974.	16,87,651 3,67,722	5,199	37,10,880 sticks.
December 1974	21,22,521 2,83,418	471	....
January 1975 ..	22,47,366 2,35,308	—	....
February 1975 ..	20,84,418 2,10,386	..	35,28,000
March 1975 ..	19,91,747 1,91,747	30	14,09,760

Splints :

Macth gross contains 144 Boxes each box containing 50 sticks.

Bengal light gross contain 144 boxes, each box containing 10 sticks.

Box Veneers :

1 Gross contains 144 outer Box Veneer s and 144 inner box veneers.

The following factories consume on an average more than 100 C. ft. of matchwood a day:—

1. Jayaprakash Match Factory.
2. Ratna Splints and Veneer Company.
3. Jegannath Industries.
4. P.S.G. Industries.

Messrs, Madras Chipboard Limited,

3.1.16. Messrs. Madras Chipboards Limited was established in Rajapalayam in the year, 1965 by Messrs. N. K. Krishnamaraja with a initial capital of 13 lakhs. Now the investment is said to be more than 50 lakhs including the annual loan of Rs. 3 lakhs for 5 years up to 1980 from Tamil Nadu Industrial Investment Corporation. With three shifts the factory have capacity to manufacture annually 1,700 tonnes of finished products or about 30,000 Boards of Size 7'×4t. Of the 18 such factories in India he Madras Chipboards sheet mostly the demands of Madras, and Pondicherry States and partly, or Mysore State. The factory employees 30 skilled and 70 unskilled labourers.

3.1.17. It is learnt that the factory reqires annually the following quantity of wood:—

1. Gyrocorpus jacquini approximately 30,000 M. Tonnes.
2. Red wood for reafers approximately 1,500 M.Tonnes.
3. Face veneers 1 m.m. approximately 3,75,000 Sq. ft.
4. Care veneers 1.5 m.m. approximately 3,75,000 sq. ft.
5. Teak logs approximately 2,000 Cubic metre.

3.1.18. They purchase their needs mostly from private merchants of Tirunelveli North Division and Ramanathanpuram Division .They manufacture what is known in the market as 'Lakshmi Brand' Chipboards and special Veneer particle Board. They get gyrocarpus Jacquini at a concessional rate from the Forest Department. It is complained that this species cannot be stored in the yard for long.

3.1.19. Their products and rates are as follows :—

Quality.	*Thickness.* 1" 25 m.m.	1-¼" 32 m.m.	1-½" 38 m.m.
(1)	(2)	(3)	(4)
	RS. P.	RS. P.	RS. P.
Both sides commercial—			
Square Feet	7—40	7—90	8—55
Square metre	79—62	85—00	92—00

	Rs. P.	Rs. P.	Rs P.
One side Teak and Other side—			
Square Feet	9 20	9 50	9 75
Commercial Square metre	99 00	102 22	104 91
Both sides, Teak—			
Square Feet	11 20	11 45	11 70
Square metre	120 51	123. 30	125 89

3.1.20 *Double Leaves.*

	SQUARE FEET.	SQUARE METRE.	
External lipping all four sides with Teakwood.	1 90	20 44	of the Board area.
External lipping on verticle edges only with teakwood	1 80	19 37	Do.
Internal lipping on all four sides with Teakwood	1 55	16 68	Do.
Internal lipping on verticle edges only with Teakwood	1 45	15 60	Do.

3.1.21. *Chip Boards and Venered Chipboards.*

	Thickness.				
	$\frac{3}{8}$"	$\frac{1}{2}$"	$\frac{5}{8}$"	$\frac{3}{4}$"	1"
	10 m.m.	13 m.m.	15 m.m.	19 m.m.	25 m.m.
(1)	(2)	(3)	(4)	(5)	(6)
	RS. P.	RS. P.	RS. P.	RS. P.	RS. P.
Plain Chipboard—					
Square Feet	2 70	2 90	3 20	3 45	3 70
Square Metre	29 05	31 20	34 23	37 13	39 18
Bothsides—					
Square Feet	....	5 20	5 20	5 50	5 75
Square Metre	....	53 80	55 95	59 18	61. 88
One side teak and other side Commercial—					
Square Feet	....	5 40	5 60	5 90	6 15
Square Metre	....	58 10	60 26	63 48	66 17
Both side Teak—					
Square Feet	—	5 75	6 00	6 30	6 55
Square Metre	..	61 88	64 56	67 78	70 48

Single Leaf.

	SQUARE FEET. RS. P.	SQUARE METRE. RS. P.	
External lipping all 4 sides with Teakwood	1 65	17 75	of the Board area.
External lipping 2 vertical edges only with Teakwood	1 55	16 68	Do.
Internal lipping all four sides with teak wood	1 30	13 99	Do.
Internal lipping on 2 vertical edges only with teakwood	1 20	12 91	Do.

SPECIAL CHIPBOARDS.

USING PHENOL FORMALDEHYDE SYNTHETIC RESIN.

	Single leaf.		*Double leaves.*	
	Thickness.		*Thickness.*	
	$\frac{3}{4}$" 19 m.m.	1" 25 m.m.	$\frac{3}{4}$" 19 m.m.	1" 25 m.m.
(1)	(2)	(3)	(4)	(5)
Both sides commercial with commercial lipping—				
Square Feet	6 90	7 15	7 30	7 55
Square Metre	74 25	76 93	78 55	81 24
One side Teak and Other side commercial with Teakwood lipping—				
Square Feet	8 70	9 05	9. 25	9 55
Square Metre	93 61	97 38	99 53	102 76
Both sides Teak—with Teakwood lipping—				
Square Feet	10 35	10 65	10 85	11 20
Square Metre	111 37	114 59	116 75	120 51

3.1.22. There is scope for small scale Chip Board Industries involving an investment of about 10,000 Rs. for manufacturing chair seats, Table tops, doors and windows, because of the availability of cheap and semi skilled labour.

Straw Board Industries.

3.1.23. There is scope for manufacturing strawboards in small scale, using the grass available in the Srivilliputhur Reserved Forests.

Maharaj Paper and Boards.

3.1.24. Recently a factory to manufacture papers and boards has been established at Maharajapuram, near Watrap, in the factory of the Ghat Forests of the Srivilliputhur Range. They are to be supplied with grasses, etc. available chiefly in this region. The factory is to go into production shortly.

Fire Works.

3.1.25. Charcoal of *Gyrocarpus jacquinii*.— There is a great demand for the Charcoal of Gyrocarpus jacquinii which mixed with chemicals for the runner thread in the manufacture of fireworks. It was not possible to assess the exact quantity used.

SECTION 2.

AGRICULTURAL CUSTOMS AND WANTS OF THE POPULATION.

3.2.1. Kamarajar District, is a drought prone area due to inadequate rains. The main agricultural crops are dry crops like chillies, cotton, coriander and Millets and ground-nut. Of late agriculture has been much improved by tractor ploughing, usage of chemical fertilizers and inmproved seed.

3.2.2. The forest area in this district is only 6.19 per cent to the total land area of the District which is very low. The only hill tribes who are living in forests are Paliyars of Srivilliputhur Range. These hill tribes are engaged in the collection of Minor Forest Produce items like Tamarind, honey, etc., and in Sandalwood extraction.

3.2.3. This area receives its bulk rainfall mainly from South-east monsoon. Usually when the departmental planting work progresses during this monsoon, the agricultural operations also are in full swing. Hence some times, we experience scarcity of labour during planting season.

3.2.4. Usually in this district the agriculturists raise dry crops and fruit crops like Guava and coconut. The cultivation of firewood tree crops is remarkably much less when compared to South Arcot and Chinglepat district. There is urgent need to popularise the cultivation of fire-wood tree crops in Farm Forestry in the private agricultural production systems.

3.2.5. The demand for green manure is seasonal and the same is being met from local resources including the forests.

3.2.6. The population census as per 1981 statistics is furnished in Table 3.1. The cattle census as per 1981 statistics has been furnished separately in Table 3.2. The cattle populations is quite large and their demand of fodder has to met with by raising fodder plantations. The demand for fuel wood also is high due to dense population and in order to meet the fuel demand, energy wood, plantations are to be raised in sufficient areas.

TABLE 3-1.

KAMARAJAR DISTRICT.

POPULATION STATISTICS.

Name of Taluk.	*Population.*	*Area in Ha.*	*Literates.*	*Illiterates.*
(1)	(2)	(3)	(4)	(5)
Rajapalayam	2,42,149	63,211	1,17,255	1,24,894
Srivilliputhur	2,25,00	5,0040	97,768	1,27,532
Sattur	3,34,454	92,637	1,55,375	1,89,079
Aruppukottai	2,51,097	1,03,100	1,25,082	1,26,015
Virudhunagar	2,04,155	57,970	1,06,368	97,787
Tiruchirappalli	82,062	55,584	28,977	53,085
Total ..	13,39,217	4,22,506	6,30,825	7,08,392

TABLE 3-2.

KAMARAJAR DISTRICT.

LIVE STOCK CENSUS—(1982 REPORT).

Name of Taluk.	*Cow.*	*Buffalo.*	*Sheep.*	*Goat.*
(1)	(2)	(3)	(4)	(5)
Virudhunagar	18,291	28,867	37,777	25,765
Tiruchuzhi	26,069	30,148	17,458	18,011
Srivilliputhur	36,675	58,585	27,517	18,744
Rajapalayam	13,894	22,958	16,067	7,047
Sattur	16,752	27,669	41,155	17,735
Aruppukuttai	42,166	50,687	37,418	36,347
Total	1,53,847	2,19,914	1,77,392	1,23,649

Agriculjural Implements.

1. *General Remarks*: Various kinds of agrcultural implements used in the farm lands constitute one of the important inputs. The adoption of mechanisation is fast picking up and in most of the places agriculture still remains as the traditional agriculture where the traditional tools and implements are used. The various types of implements used are enumerated below :

Types of Agricultural Implements.

1. Transporting of inputs and outputs. Bullock cart and hand drawn carts.
2. Loading and unloading of inputs and outputs. Baskets and Thattus.
3. Storage bins for storing outputs. Thombai made of wood and also of bamboo splints (evolved by Tamil Nadu Agriculture University).
4. Tool boxes .. Made of wood.
5. Ploughing .. Plough share, handle and pole.
6. Land levelling Leveller made of wood.
7. Hoeing and Weeding. .. Manvetty and kalaikottu weeding implements grass cutting implements.
8. Harvesting .. Sickle.
9. Felling of trees .. Axe and Saw.
10. Sawing .. .. Saw of various kinds.
11. Billetting .. Various sizes of knives commonly called Koduval or Kathi.
12. Winnowing .. Winnow or muram made of bamboo.
13. Packing .. .. Wooden packing cases and bamboo baskets.
14. Farm sheds .. Poles and roof materials.
15. Fencing materials. Thorns and Biofencing materials, Bamboo padals and Brushwood thattis.
16. Plucking of fruits. Thoraticol—a long stich attached with hook at terminal end.

3. Species preferred.

(i) *Plough share* :

It has been ascertained from enquiry among the ryots that the plough share has to be renewed annually for dry cultivation and biennially for wet cultivation depending upon the intensity of usage two ploughing species preferred are as follows :—

(*a*) Share : Teak, Babul, Neem, Usil, etc.,

(*b*) Shaft : Teak, Konnai, Puvarasu, Karungali, Nona.

(*c*) Hanle : Babul, None, Puvaratu etc.

(*d*) Yoke : Nona is considered the ideal choice.

(ii) Manvetti and Kalaikottu handles.	They are used for heing and as weeding implements :Handles preferred is that of satinwood (*Chrolexylen* Swietenia).
(iii) Bullock cart	Bullock cart remains the cheapest mode of transportation and its importance has not declined. The species preferred for various parts are given below :
	(*a*) Wheel spokes; Puvarasu, Babul, Vagai.
	(*b*) Wheel felloes : Babul and Kodukkapulli.
	(*c*) Hub or nave : Vagai
	(*d*) Arbor or axle tree :Kodukkapulli and Mango trees.
	(*e*) Shaft or thill : Vagai.
	(*f*) Poles on sides : Alingai
	(*g*) Chassis : Vagai, Malaivembu, Etc.
(iv) Muram	Used for winnowing and only species used is bamboo.
(v) Thattu	For loading and unloading of the manure; made of forest climers like pavetta indica and Bamboo.
(vi) Baskets	Made of Bamboo splints, used for transport of Agricultural produce.
(vii) Other house	hold implements : Ulakkai-Karunkali and Porasu.

ESTIMATE OF WOOD REQUIREMENT.

1. STATISTICS.

On the basis of estimates made by the statistics department, the Joint Director of Agriculture, Saidapet gave the following information regarding the number of various implements and machineries in the Kamarajar District.

(*a*) ploughs :	–	2.75 Lakhs.
(*b*) Bullock carts :	–	0.35 lakhs.
(*c*) Tractors :	–	0.012 Lakhs.
(*d*) Oil engineering :	..	266 numbers.

2. RENEWAL.

The renewal and replacement period for various implements are as follows :—

1. Handle for various implements.		2—3 years.
2. Plough share	..	1—2 years.
3. Bullock cart .—		
Spokes	..	3 to 5 years.
Felloes	..	2 to 3 years.
Chassis	..	6 to 7 years.
Axle	..	4 to 5 years.
4. Other implements	..	5 to 6 years.

Estimates for wooded requirements has to be done on the basis of future requirements for new items as well as for annual repair and renewal. Suitable methodology has to be designed for the purpose.

3. METHODOLOGY.

The methodology communicated by Government of India in Ref. No. 1 (1) 18/82 D.P.A.P.

Government of India, Ministry of Rural development Krishi Bhavan, New Delhi, dated the 20th September 1983 addressed to the project Directors of D.R.D.A. of various D.P.A.P. Districts on the basis of the guidelines issued by the forestry Division. Ministry of Agriculture prescribes the following norms.

Agricultural implements.

(Wood requirement in Cubic metres).

Plough	..	0.040
Leveller	..	0.070
Sickle	..	0.003
Yoke	..	0.400
Dehusker	..	0.160
Axe	..	0.002
Harrow	..	0.020
Hoe		0.001
		0.336

In the same reference it has been mentioned as follows : Since these implements are required twice a year, total requirement of wood for one set would be 0·672 cubic meter (0.33 x 2) per year. If the family owns a bullock cart it will need 0.05 cubic meter.

WOOD REQUIREMENT : SUPPLY.

The wood requirement for the handles of the various implements, and bullock carts and plough share are to be obtained from the trees of the Agro forestry sources or from the forestry sources. The wooden parts of the various implements are to be periodically. The various parts of bullock cart and ploughshare require wood of specific size quality and species.

Considering the availability of various species in the region and suitability of various species for various kinds of implements, we can narrow down our choise for the following species to meet the entire requirement.

Botanical name.	*Local name.*	*Suitability co-efficient (F.R.I.)*
(1)	(2)	(3)
Acacia nilotica	Babul	221
Alibizzia	Vagai	..
Thespesia populnea	Puvarasu	216
Choroylon swietenia	Porasu	202
Morinda tinctoria	Nona and	..
Azadarichta indica	Neem	159

The details of various species suitable for various handles as found out by the F.R.I., is given is appendix—XXII.

The single species which can meet about 90 per cent of the needs of the agricultural implements including bullock carts and ploughshare is babul. It is not only highly suitable but also preferred. In fact the felling of Babuls plantations for fuel wood purposes of urban markets needs to be thoroughly re-examined. If the existing resource of Babul plantations are properly utilised, it can meet the entire wood needs of the Agricultural activities barring new parts in bullock carts.

Should we create new resources when we can meet the existing requirements by deploying the existing babul resources? What is needed is an appropriate, strategy for resources utilisation. Diverting Babul for urban wood fuel market amounts to abuse of resources at the cost of Agricuturists and Rural people. Should our priority be urban fuelwood or Rural Agricultural needs. Answer to this question may lead to evolving a suitable strategy for Babul utilisation . By proper planning, and saturating all the tank beds and tank bunds with Babul trees, all the wood based needs of Agricultural implements of rural population can be met.

SECTION 3.

Markets and Marketable products.

3.3.1. The marketable products are mostly the Minor Forest produce items like, Tamarind, Pungam seeds honey etc., and the Timber products include teak-wood, Sandal wood and Eucalyptus wood in addition to the industrial wood namely Gyrocarpus jacquini and Eucalyptus tereticornics.

3.3.2. The marketable places for the industrial wood are the concerned industries in Rajapalayam and Seshashayee paper industries in Erode. The marketable place for the minor Forest produce are the Srivilliputhur, Rajapalayam, Madurai and other produce are the Srivilliputhur, Rajapalayam, Madurai and other urban centres. The main market centre for the wood fuel is the urban centresof Rajapalayam, Srivilliputhur and other textile centres

SECTION 4.

Lines of Export.

3.4.1. This division is well connected by a net work of good roads and Railways.

1. *Railways.*—Meter guage of Southern Railway.
   1. Tenkasi Vridhunagar-Madurai Chord line.
   3. Tuticorin-Vridhunagar.
2. *Roads* :
   1. Tenkasi—Madurai.
   2. Madurai—Sivakasi.
   3. Madurai— Sattur.

3.4.2. Forest produce are transported mostly in carts and lorries through the fair weather earthern roads in Alagarkoil Valley and Seithur Ex-estate forests. These roads often require repairs and the forest contractors used to carryout the repairs depending upon their necessity. Laying of new roads or maintenance of the existing roads are not advocated in view of the danger they pose to the foressts in the form of illicit fellings.

SECTION 5.

Methods of Exploitation and their costs.

3.5.1. Fuel and small timber coupes are worked under Siluicultural systems till 1980. As the sale of fuel coupe are suspended by the Government the Working of coupe are stopped. Only the dead and wind fallen tre are collected then and there and sold in auction.

3.5.2. Odai plantations in this divisions are not matured and no felling is done so far.

3.5.3. Eucalyptus is allotted to Seshasayee Paper Mills by the Government on a seigniorage rate of Rs. 100 metric tonne. The Seshasyee Paper Board has to bear the cost of felling (Coppicing). The wood upto 5 cms. diameter over bark is taken by Shshasaayee Paper Board Limited. The wood is debarked. These barks and the reject wood (Lops and tops) are sold in auction to public. Sheshasayee Paper Board Limited work the Eucalyptus Hybrid Plantations by their contractors and per stack i.e., 1.1.M.T. of 1 m x 1 m x 2m size the labourers are paid about Rs. 20.

3.5.4. *Minor Forest Produce.*—All the Minor Forest Produce except honey bees, wax, ivory, deer, Sambar horns are being sold to the Hill tribe-Co-operative Society and the society collects them. The Chief product is Tamarind.

3.5.5. *Sandalwood.*—Only dead trees and pieces of wind fallen trees and diseased trees are collected departmentally as per the Sandal wood extraction proceedures laid sout by the Chief Conservator of Forests. The trees collected are transported to Sirivilliputhur rough cleaned nad despatched to final clearing depot at Salem for disposal and in public auction.

CHAPTER IV.

I. STAFF AND LABOUR SUPPLY.

4.1.1. The establishment of the Division as sanctioned in G.O. Ms. No. 866, Forests and Fisheries department, dated 5th September 1985 is as follows :—

Serial number.	Designation.	Permanent.	Temporary.	Total.
(1)	(2)	(3)	(4)	(5)
1.	*A. Administrative*—			
	District Forest Officer (Deputy Conservator of Forests).	1	—	1
	B. Ministerial—			
2.	Junior Accountant ..	1	..	1
3.	Draftsman, Grade III ..	1	—	1
4.	Record clerk	1	—	1
5.	Assistant	1	..	1
6.	Junior Assistants ..	2	..	2
7.	Typist	1	..	1
	C. *Others*.—			
8.	Jeep-driver	1	..	1
9.	Office-Assistants	3	..	3
10.	Office watchman ..	1	—	1
	Total ..	13	..	13

4.1.2. *Establishment of range staff in Kamarajar division* :—

Serial number.	Description of staff.	Name of post.	Srivilliputhur Range. Permanent.	Srivilliputhur Range. Temporary.	Rajapalayam Range. Permanent.	Rajapalayam Range. Temporary.	Wild Life Range. Permanent.	Wild Life Range. Temporary.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	Executive ..	Ranger	1	..	1	..	1	..
2.	Protective ..	Foresters	3	1	3	..	2	2
		Forest Guards	12	1	9	..	1	4
		R. Watcher	..	12	..	10	..	..
3.	Ministerial ..	Assistant	..	..	..	1	..	..
		Junior Assistant	1	..	..	..	..	..
4.	Others	Tractor Driver	1	..	..	..	..	..
		Tractor Cleaner	1	..	..	..	..	..
		Office Assistant	1	..	..	..	..	..
		Office Watchman	—	..	1	..	..	—
		Total ..	20	14	14	11	4	6

NOTE.—Pudupatti and Seithur Ranges sanctioned in G. O. Ms. No. 866 Forests and Fisheries Department, dated 5th September 1985 are yet to be formed by, bifurcating Srivilliputhur and Rajapalayam Ranges respectively.

4.1.3. *Salary Details for the establishment —*

Serial number.	*Name of the Post.*	*Scale of Pay.*	*Number of posts.*	*Average pay.*	*D.A.*	*H.R.A.*	*O.A.*	*Total for one month*	*Total for one year.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	District Forest Officer (Deputy Conservator of Forests Non-I.F.S.)	1,800—110—2,900	1	2,350	282	175	40	3,207	38,484
2	Range Officers ..	1,160—50—1,460—70—1,950.	3	4,800	402	345	705	6,252	75,024
3	Foresters	705—20—745—25—845——35—1,230.	11	10,835	1,133	770	1,045	13,783	1,65,396
4	Forest Guards.. ..	505—10—555—15—615——20—795—25—845.	27	18,225	1,924	1,120	1,350	22,619	2,71,428
5	Draughtsman Grade-II.	705—20—745—25—935—1,230.	..	1,880	92	55	..	927	11,124
6	Junior Accountant ..	705—20—745—25—845——35—1,230.	..	1880	92	55	..	927	11,124
7	Assistants	705—20—745—25—845——35—1,230.	2	1,760	184	110	..	1,954	23,448
8	Junior Assistant ..	610—20—730—25—955——30—1,075.	3	2,565	270	210	..	3,05	36,540
9	Typist	610—20—730—25—955——30—1,075.	1	855	90	70	40	1,055	12,660
10	Office-Assistants ..	450—10—570—15—720—	6	3,510	366	240	12	4,128	49,536
11	Jeep-Driver	555—15—615—20—795—25—970.	1	775	81	55	35	946	11,352
12	Tractor-Driver ..	555—15—615—20—795—25—970.	1	775	81	55	35	946	11,352
13	Tractor Cleaner ..	450—10—570—15—720—	1	585	61	40	..	686	8,232
14	Record Clerk	505—10—555—15—615——20—795—25—845.	1	675	71	40	..	786	9,432
15	Office Watcher ..	450—10—570—15—720	2	1,170	122	80	..	1,372	16,464
16	Reserve Watcher ..	450—10—570—15—720	22	12,870	1,342	880	660	15,752	1,89,024

NOTE.—The total amount shown here does not include the salary of the staff of the two ranges that are yet to be constituted.

SECTION 2.

Labour Supply.

4.2.1. Unskilled labour : Generally difficulty is not experienced in obtaining unskilled labour. As the planting season coincides with agricultural operations. such as ploughing planting and sowing in agricultural fields. labour scarcity is experienced during peak Agricultural season.

4.2.2. Hill tribes : The only hill tribes available in this division are the Panchayat who inhait the Ghat Forest especially in Alagarkoil valley and Ayyanarkoil valley. They are engaged in Sandal wood extraction works and collection of M.F.P. through their co-operative society.

4.2.3. Skilled labour : Usually skilled labour are to be imported from the nearby towns. As the departmental wages are lesser than the wages paid in town and also due to the difficult workiLg conditions, it is very difficult to obtain skilled labour.

4.2.4. Wages : The following are the wages payable for the various labourers in various ranges of this divisions as per the Madurai Conservator's F.S.R. for 1986—87.

Grade—I Labour	Rs. 12 day.
Grade—II Labour	Rs. 10 day.
Grade—III Labour	Rs. 8 day.

The wages of skilled labour per day as per P.W.D. schedules of rates for 1986—1987 for this district is as follows :—

	Class—I.	Class—II.
(1)	(2)	(3)
Mason	Rs. 23.00	Rs. 21.00
Carpenter	Rs. 23.00	Rs. 21.00
Stone cutter	Rs. 23.00	Rs. 21.00
Wodder	Rs. 15.00	

CHAPTER V.

PAST SYSTEM OF MANAGEMENT.

Section 1—Political History.

5.1.1. The present Kamarajar Forest Division was part of the erstwhile Ramanathapuram Forest Division, Ramanathapuram according to the prevailing legend, was a city built by 'Guha' near Sethu (Adams Bridge) under the directions of Lord Ramanathaswamy, Neelakanta Sasthri, in his Pandian Kingdom' states that this area part of the Pandian Kingdom upon 10 Century A.D. when it passed under the rule of Cholas and later reverted to Pandiyas. During this period, this region has been the scene of many a battle between Cholas and Pandiyas. In the 12th Century A.D. this part of the century was under the sway of the King of Ceylon, Lankapura'. In 1311 when Malikapoor invaded Madurai, only heriditary chief tains ruled different parts. After the fall of Madurai Sultanate, the country passed under Vijayanagara Empire and Visvanath Nayakar and Muthukrishnappa made one Sadaya theva Udayar of Pogalur to rule the country to protect the people from dacoits and to arrest Maradevar conversion to Christianity by Portughese. As he become the ruler of Sethu, he is called Sethupatty and rulers there after were called Sethupathis.

5.1.2. *The Nayaka dynasty includes* :

1. Viswanatha Nayackar	1529 to 1564 A.D.
2. I. Krishnappa Nayakar	1564 to 1572 A.D.
3. Veerappa Nayakar ..	1572 to 1595 A.D.
4. II Krishnappa Nayakar	1595 to 1601 A.D.
5. Muthukrishnappa Nayakar.	1601 to 1609 A.D.
6. I. MuthuNaicker ..	1609 to 1623 A.D.
7. Thirumalai Naicker ..	1623 to 1659 A.D.

5.1.3. During Thirumalai Naicker period, Madurai Perunadu (1623 to 1659) consisted Dindigul, Madurai, Tirunelveli, Trivandram (Part), Ramanathapuram, Sivagangai, Pudukottai, Tiruchirappalli, Salem and Coimbatore areas. Muthu Veerappa Naicker changed the head-quarters from Tiruchirappalli to Madurai after ruling 7 years in Tiruchirappalli. Thirumalai Naicker, faced 5 battles.

1. Battle with Mysore Raja at Dindigul.
2. Trivancore Battle.
3. Battle with Ramanathapuram Sethupathi.
4. Battle with Vengata Nayakar of Vijayanagaram.
5. Battle with Shrirangam (1645) helped by Bijapoor Sultan.

5.1.4. Sethupathis rule of 375 years is classified as follows :—

1. *Under Madurai Nayakar* : 7 Sethupathis ruled or 70 years. 16?4 to 1673 A.D.

2. *Independant ruling.*—8 Sethupathis ruled for 120 years. 1674 to 1795 A.D.

3. *Under the control of British.*— 10 Sethupathis ruled for 50 years 1795 to 1947 A D.

4. *After Independence.*—2 Sethupathis ruled for 30 years. 1947 to 1977 A.D.

5.1.5. With the help of Thirumalai Mannan, Thambi got the rulership. Kattathevar was defeated in the battle and Thalavai Ramappiar constructed the *Pampan Bridge* and arrested Kotta Sethupathi. Thambi thevar was opposed by Ramanatha Thevar, Narayana Thevar and he was removed from rulership by Thirumalai Mannan and Sadathevar was nominated Sethupathi. He was cunningly killed by Thambi thevar. In 1645 Thirumalai Mannan trifurcated the land by giving Ramanathapuram to Regunatha thevar, Sivagangai to Thambi thevar and Thiruvadanai to Thanaka thevar. After the death of Thambi and Thanaka thevar, Regunatha thevar ruled the entire area.

1. Thirumalai Sethupathi—1645 to 1672 A.D.,

2. Regunatha thevar—1674 to 1710 A.D.

5.1.6. Regunatha thevar created one Nekottaipalayam and entrusted this area to his relative, one Peria Udaya thevar. In the later days this area became the Sivagangai Kingdom.

3. Vijayaregunathan —1710 to 1720 A.D.

4. Bhavani thevar—1720 to 1720 A.D.

5.1.7. In 1729 Bhavani thevar was defeated by Thanjai Saraboj Raja. North of Pamban, certain portions were added to Thanjavur Raj and the remaining portions were separated into 5 bits. Three bits were given to Kumramuthu Vijaya Regunatha Sethupathi (Ramanathapuram Raj) and two bits to Sasivarna Thevar (Sivagangai Raja).

5.1.8. During 1480 A.D. due to severe swelling of waves of the sea, Pamban way was cut off and Rameswaram become an Island Sethu Dam was 30 miles long 1.5 miles wide. Traffic by ground to Ceylon was there from India up to 1480. Rameswaram faced floods during 1920, 1922 and 1925 and the sea swelled up, during 1932, 1955 and 1964. On 22nd December 1964 the Pamban Railways Bridge collapsed due to severe raising of the Bay.

The bridge was constructed during 1914 with a length of 214 feet. The Pamban canal's length is 4232 feet and 14 feet deep. The drought years in the District are : 806, 1812, 1814, 1825, 1833, 1876, 1878, 1918 and 1936.

5.1.9. At the fail of Vijayanagaram Empire the local chieftains took control of the areas called Palayakar (Polegar). This Palayakar were approved by the Viswanatha Nayakar as his agent to collect the kist from different areas and for smooth running of the administration. During the Nayakar period, there were 72 palayams and this has

come down to 46 during the 18th century. Palayar remitted one third of the tax collected to Nayakars and the balance were enjoyed by them.

5.1.10. Most of the Palayams were mountains surrounded by Forests. Palayadar destroyed the forests and created new villages and Agriculture field and dams for the improvement of Agriculture.

5.1.11. In the 17th and 18 Century Maravar's Sethupathis were rulling Ramanathapuram, Sivagangai and Pudukkottai with headquarters at Ramanathapuram. Their regime was in North from Vellar, Aranthangi to South Sayalkudi touching sea coast of the Bay of Bengal and is called Maravar Nadu. Maravars are called fighters. Thevar consists of Maravar, Kallar and Agamudayars and the three are collectively called Mukkulathor. Local Maravar leaders (Palayakar) accepted Ramanathapuram Sethupathi as their Sethupathi or Thalaivar Palayakar regime varied from small to big portion of the country. They were enjoying the land like zamin or Zagirdar.

5.1.12. In 1780 one Velu Nachiar (Woman) became the queen of Sivagangai. She was assisted by two Maravas : Vella marudhi alias Periya Marudhu and Chinna Marudhu. They gave stiff fight to the British and defeated the British army in Thirupathur and Natham. In 1781 the British obtained from the Nawab of Carnatic the management and control of the revenue of Thirunelveli and Ramanathapuram districts on condition that the Nawab was allowed a sixth of the revenue for his personal use.

5.1.13. After the defeat at Thirupathur and Natham Edward Clive requested for reinforcement of army from England and Colombo. To capture Marudhu brothers the English have cleared the dence forests from Siruvayal to Kalaiyarkoil for over a distance of 5 miles by engagine thousands of men for about a month brought from Dindigul and Pudukkottai and supervised by 200 Englishmen. They could not achive their object and returned.

5.1.14. In 1801 the British defeated the Marduhu brothers in the battle at (Kanappor) Kalayarkoil and the brothers were hiding themselves in Singampunarn forests And again in the battle at Cholapuram arud his brothers were arrested on 19th October in 1801 A.D. 24th October 1801 A.D. they (Maruthu brothers) were hanged at Thirupathur.

5.1.15. With the help of Ettayapuram palayakar, Pudukkottai Raja and Ramanathapuram Raja the. Southern parts of Tamil Nadu came under the rule of British.

SRIVILLIPUTHUR FORESTS.

5.1.6. Destruction of the plains forests and the more accessible Ghat Forests on the outer slopes resulted since no steps were taken by the British to conserve the forest resources between 1801—1854 and allowing ryots to fell and remove wood for agricultural implements and fuel for domestic consumption without payment and permitting felling and removal of timber subject to a tax which in the absence of all supervision was easily evaded.—

5.1.17. In 1860, a set of simple rules called the 'Jungm Conservancy Rules' were issued to regulate removals from forests and collection of revenue. The revenue collected from these sorces was allotted to the Jungle Conservation Fund which was expended to raise plantations close villages for convenience and comfort of villages communities and to guard against an eventual scarcity in wood. The collector was given the liberty of administering the fund. The effort to form village plantation failed partly from insufficiency of funds and lack of knowledge of planting methods, but chiefly from apathy and utter indifference of the people themselves, their short-sightedness in not appreciating the advantage of an under-taking which did not appear to them to give on immediate or Individual return being commented upon by almost every collector of the District. *This is perhaps the begin of Social Forestry.* In Tamil Nadu and unfortuanately even after 120 years, the attitude of the people remains largely unchanged.

5.1.18. The period between 1865 and 1882 is significant in the annimals of the forests comprising the upper and lower slopes of the Srivilliputhur, Valaikulam and Watrap forests. They were placed under an overseer of the newly created 'Forest Department'.

5.1.19. *Collector Mr. Puckle.*—Mr. Puckle, Collector of Tirunelveli had an amazing zeal for forest conservany. which outern even that of the Forest Officers of the period. He was convinced that the prosperity of the irrigation system in the plains below fully depended on the state of growth on the hills above and made serious attempts to conserve the remaining forests most carefully with a view increase the number of perennial streams. He accordingly prescribed the issue of licences to cut timber, for bade cultivation and charcoal burning in the forests, and restricted grazing and the cutting of fuel by ryots to certain limits defined separately for each village. Captain Beddome, the Conservator of forests felt that these prohibition endangered forest revenue and adcoated a system of regulated fellings. Mr. Puckle on the grounds that the irrigation of the district would be seriously jeoparadised if Captain Beddome was allowed to have his way, appended to Government, who warmly supported him. In 1869, Captain Beddome revisited the division and reported that the best efforts of every one concerned had failed to secure anything that could be properly called conservation. Mr. Puckle was at least a hundred years ahead of his time.

THE FOREST COMMITTEE (1878—1882).

5.1.20. In 1878, a committee consisting of Colonel Camphell Walker the Conservator of Forests, Mr. Hayne, the District Forest Officer and Mr. Pennington, the Collector of Tirunelveli was appointed to consider the important subject of reservation and to advise generally on future forest policy in the division. Their recommendations with reference to Srivilliputhur forests may be summarised as follows :—

(*a*) The forests on the outer slopes nearest to the villages were to be divided from the rest by a cleared line and to be assigned for communal purposes.

(*b*) No fresh pattas were to be granted in the Ghat forests.

(*c*) The forests in Srivilliputhur Taluk were proposed to be constituted into one block of 98.87 square miles (257.06 Square Kilometers.)

(*d*) In the blocks proposed for reservation, it was recommended that if pasture was to be permitted it should be on payment as it was found on enquiry that no rights of grazing existed in these areas.

(*e*) Arrangements were to be made to secure the conservation of private forests at the hands of their owners.

(*f*) Small portions of the communal forests were to be closed for grazing for generation and improvement, and free grazing was to be permitted in the open areas under such safe-guards against fire and other damage as might be decided upon by the collector and the District Forest Officer.

5.1.21. The proposals were accepted by the Government but no further action was taken until the Madras Forest Act was passed into law in 1882.

5.1.22. *Dr. Brandis's visit*.—Dr. Brandis, the Inspector-General of Forests visited the Srivilliputhur forests in February 1882. His voluminous report in which he outlined the future forests policy to be adopted still remains a monumental work and has been the basis of many of the Working plan which followed. The objects of forest conservancy in the Srivilliputhur forests were stated by him to be .

(1) To protect the ghat forests in order to secure the continuance of the water-supply which the irrigation and hence the prosperity of the ryot depended.

(2) To maintain the fuel supply and increase of fodder during seasons, of such waste lands as could be set apart for growth.

5.1.23. With this object in view his recommendations were as follows :—

(1) That the whole area above the outer line laid down by the Revenue Survey as the limit of cultivable land should be reserved under the Forest Act, as far as it was at the disposal of the Government. This radical proposal had the effect of obliterating the commual forests proposed by the Forest committee in 1878, but was defended by Dr. Brandis on the ground that although it might restict the extension of cultivation, it was infinitely more important in the interests of irrigation on the plains, that these forests should be preserved and extended. Besides it was realised that a boundary half way up the hills would be difficult to select and maintain, besides increasing the difficulty of effectively conserving the inner reserves from illicit removals.

(2) As regards the requirements of the villagers adjoining the forests, he recommended that these should be met from waste lands within the Revenue survey limits, and if this was not possible it should be restricted to those areas which were outside the blocks set up for protection from fire with view to their improvement.

(3) On the subject of Forest Revenue Dr. Brandis advocated the continuance of the prevailing system of extraction but favoured the restriction of removals to the areas which were not specially fire protected.

PERIOD OF ORGANIZATION (1882—1887).

5.1.24. In 1883, the complete charge of the Ghat forests of Srivilliputhur was placed in the hands of the Forest Department and Captain Fullerton was appointed as the First District Forest Officer of the combined Tirunelveli and Madurai Forests.

5.1.25. During the periods 1882—1886, the work of the Forest staff consisted mainly in the organisation and collection of revenue. The whole of the extraction of timber was still under the licence and voucher system.

5.1.26. In 1886 the Conservator of Forests, col Campbell Walker again condemned the licence and voucher system; "under it" he said 'hundreds of men enter the forests daily, cut under no regulation do infinite damage, and numerous issuing and recovering officers have to be employed to collect the fees which they supplement by petty extractions in their own account. He urged its gradual substitution by departmental working. This was accordingly carried out by the then Disttict Forest Officer Mr. Brasier, who replaced the un-restricted entry and felling on permits by regular fellings of selected areas or 'coupes' under departmental supervision and even persons permitted to remove headloads of deadwood being required to remove them from the annual coupes. This was a vast stride in the light direction and although the departmental working proved a loss, silviculturally, the system was reported to be successfu as the one year old coppies was over 7 feet (2.1 metres) and the ground was carpetted with seedlings. The weakness of the method, however was that the areas selected (Coupes) were scattered, and hence difficult to control and the best growth was always being felled.

SECTION 2.

ADMINISTRATIVE HISTORY OF THE FORESTS.

5.2.1. In 1781, the British obtained from the Nawab of carnatic the management and control of the revenues of all the carnatic provinces including the areas occupied by the present Tirunelveli and Ramanathapuram districts on the condition that the Nawab was allowed a sixth of Revenue for his personal use. In 1790, a Board's of Assigned Revenues was created to administer the revenues and Mr. Benjamin Torin was appointed as the first collector of the new Tirunelveli district of which the present Srivilliputhur taluk fored apart of the newly carved out Madurai District.

5.2.2. A decade of acute anxiety caused by a succession of rebellions by local cheiftains followed. Military reports of the suppression of these rebellions are replete with descriptions of the extent to which the dense jungle surrounding the present towns of Rajapalagam Srivilliputhur and watrap and most of the plain country till the sea-coast hampered military operations. The town of Sayalgudi was once situated in so dense a forest that the rays of the sun could not pierce through; hence it was called Sayalgudi. Most of the tracts

in question are now quite bare of forest growth. On the 31st July 1801 an agreement was effected with the Nawab of the Carnatic by which the exclusively administration of the Civil and Military Governments of all the territories and dependancies of the carnatic was handed over to the East India in company in perpetuity and the areas forming part of the present Tirunelveli and Ramanathapuram districts were thus brought under the new soveriegn power.

5.2.3. For years after the assumption of British rule the forests attracted but little attention from the Government. Undoubtedly there was too much of it and the conversion of a large part of it into cultivable land was desirable. It does not appear from the available information on the subject, that any steps were taken by the British or by the Indian Rulers to conserve the forest resorces of the division. Cultivation was restricted to the river valleys, the intervening land being covered with jungle, which was infested by robber gangs who made travelling without a strong escort a risky adventire to be undertaken only under dire necessity. It appears that from the earliest times ryots were permitted to fell and remove without permission or payment, wood for agricultural implements only, and fuel not exceeding a headload at a time for demestic consumption. The only attempt at Conservation made was the levy of tax on all valuable timber felled of which a list was drawn up. The Government reserved the right tolevy the tax only on such land onprivate rights were asserted by the Indian Rulers. These consisted of the forests comprising of the upper and lower slopes of Srivilliputhur, the Valaikulam forests and the hill slopes south or Watrap villages.

5.2.4. The Seithur forests were claimed by the Zamindar of Seither, while in the east the Zamindar of Ramanathapuram and Sivaganga laid their claims on the entire forests on the eastern plains, all of which were upheld by the Government. These rulers enjoyed the privilage of taxation on timber trees on their lands. The right of the Zamindar of Ramanathapuram to collect tree tax in the Rameswaram island was objected to for a long time by the British but the dispute finally settled in favour of the Zamindar.

5.2.5. The Srivilliputhur taluk continued to be the part of the Tirunelveli Revenue district untill 1911 when the new Ramanathapuram Revenue District was carved out. In addition to the Srivilliputhur taluk the areas comprising of the present Sathur Aruppukkottai, Paramakudi, Mudukulathur Ramanathapuram Sivaganga and Thirupathur taluks which till then formed part of the Madurai Revenue District were added on to the new district. However as the only Government Forests in the district were confined to the Srivilliputhur taluk only the management of the present reserved forests in this taluk was vested under the control of the District Forest Officer, Tirunelveli as a separate Range as a measure of administrative convenience.

5.2.6. With the encatchment of the Madras Estates Abolition and conversion into Riotwari Act, 1948 Sizaeble areas of Ex-estates and Inam lands in the district were vested with the Government. The Sivaganga and Ramanathapuram ex-state forests and the Inam forests in the eastern portions of the district were transferred to the District Forest Officer, Madurai East ForestDivision and constituted into a separate Range called the Sivae ganga Range on 15th October 1951. The Seithur ext estate forests were transferred to the control of the Forest Department on the 5th February 1954 ahd were amalga mated with the Srivilliputhur Range under the controial of the District Forest Officer, Tirunelveli -cum-Ramanathapuram Forest Division.

5.2.7. As the jurisdiction of these two divisions were un-widely, the Government in their order Misc. No. 2977 Food and Agricultural, dated 21st December 1956, ordered the formation of a new divison called the Ramanathapuram Forest Division comprising of all the Forests under the control of the Forest Department in the Ramanathapuram Revenue District. The new divison was constituted into being on 5th February 1957. At the same time the Sivaganga Range was split up into four components, each of which were constituted into separate ranges. The Division consisted of five territorial Ranges Viz., Srivilliputhur Thirupathur, Karaikudi, Rameswaram and Sivaganga Ranges.

5.2.8. At present Ramanathapuram district has been trifurcated as Ra,anathapuram District. Pasumpon Muthuramalingam District and Kamarajar District whose headquarters are Ramanathapuram. Sivaganga. and Virudhunagar respectively and the erswhileRamantatha puram Forest Division was bifurcated into Ramanathavram-cum-Pasumpon Muthuramalingam Forest Divison with headquarters at Sivaganga and Kamarajar Divisio with head quarters at Virudhunagar.

SECTION—3.

HISTORY OF THE PERIOD OF WORKING PLANS.

5.3.1. From 1891, the system of working areas on the principle of sustained yield was introduced, and many working plans were prepared covering the greater part of the workable areas of forests. The following table gives a list of such working Plans :—

Serial number.	*Year of sanction.*	*Authority.*	*Name of the working circle.*	*Area in acres hectare.*	*Author.*
1.	1897	B.P. No. 8721	Ayyanarkoil	429.6 (173.5)	H. B. Bryant
2.	1897	B.P. No. 8721	Valaikulam	1,145 (463.3)	-do-
3.	1897	B.P. No. 8721	Rengarkoil	2,265 (916.6)	-do-
4.	1902	B.P. No. 210	Pudupatti	1,167 (472.2)	P. K. Kushington
5.	1902	B.P. No. 210	Srivilliputhur Ghat Forests.	38,035 (15.382.7)	-do-

5.3.2. *Revision of working plans.*—In 1915, and the year following many of the old working plans were due for revision and new working plans for nither to unworked areas were to be prepared. The appointment of a working plan officer was contemplated as early as 1915, but owing to the Great war and the consequent shortage of officers, no officer could be spared till 6th September 1917,when Mr. G. C. Robinson was appointed as Working Plan Officer for the entire Thirunelveli-*cum*-Ramana thapuram forests. This officer was provided with a smal staff and the work of collecting information on which to base the working plan of whole division was proceeded with. Unfortunately Mr. Rabibson was transferred on 4th February 1919 before the could complete his work and thus the labour of nearly one and half years had to be sacrified the cost of the working plan having amounted to Rs. 16,000· The work was subsequently ordered to the be taken up by Mr. GeorgeVenugopal the District Forest Officer, who prepared a working P- which however did not receive the sanction of the Chief Conservatior of Forests, as it was found defective in parts.f It was however approved as a temporary scheme for three years duringwhich expire the District Forest Officer was order to revise irt in accordance with the Chief Conservator's Orders on the subject. Nothing more seems have been done till 1930 when a second working plan was prepared by r. B. J. Singh the, then District Forest Officer. This plan was also found defective and Mr. E. A. Lasarado was appointed on the 22nd November 1931 as working Plan Officer for the entire Thirunelveli-*cum*-Ramanathapuram Forest Division and he prepared a ten year plan which was to expire on 31st March 1944.

5.3.3 Mr. V. S. Krishnaswamy who was appointed for the revision of the plan in1942 took two years to prepare a scheme to tide over the war years, but as it was found defective, the Chief Conservator of Forests ordered the extension of Mr. Lasrado's plan till a fresh working plan officer Mr B. A. Kariappa was posted on 12th June 1946. Mr. Kariappa prepared the revised working plan for the division for a period of 15 years from 1st April 1949 to 31st March 1964.

5.3.4. The new division catled Ramanathapuram Forest Division comprising of all the forests under the coutro of Forest Department in the Ramanathapuram Revenue District came into being on 5th February 195(. A working plan division to prepare the plan for the newly constitution Ramanathapuram division was formed on 9-8-58 and Thiru J. Wilson prepared the plan for the period from 1-4-1960 to 31-3-1970.

5.3.5. The next revison was taken up on 9th June 1922 and the Reconnaiseance report was prepared by thiru T.K. Srinivasan The working plan for the period of ten years from 1-4-1974 to 31- -1984 was written by Thiru A. Saldhana.

SECTION 4

RESULTS OF PAST MANAGEMENT

A. FUEL SERIES

5.4.1. Method of Treatment : Simple coppice, a modified coppice with s an ares with reseve Thiru A. Saldhana had advocated coppice with reserves.

5.4.2. *Rotation.*—Messrs. Bryant and Lishington prescribed 20 years rotation. Mr. G. Venugopal revised it to 30 years till Thiru J. Wilson modified it to 40 years and Thiru A. Saldhana endorsed it. Mr. Cariappa revising the Working Plan of Mr. Lasarado deleted Kunnur series from working on account of paucit of growth and Mr. J. Wilson who followed him excluded from working the Rengarkoil felling series for the same reason. Mr. Wilson added two series Melvannniriruppu and Piranpatti in Prianmalai forests in his working plan.

5.4.3 In May 1970, the Chief Conservator of Forests, Madras in his Ref. No. D1-7627-70, dated 11th May 1970 ordered the stoppage of all exploitation in the Prianmalai forests, at the instance of the then Hon. Minister of Industries. Government of Tamil Nadu consequently the Melvannarirppu and the Piranpatti series constituted in the Working Plan of Mr. Wilsomn were wound up. While ordering the stoppage of all exploitation in Piranmalai block, the Chief Conservator of Forests ordered that a committee consisting of some important local residents be set upto secure the co-operation of the public in improving the forests in these blocks. Accordingly the committee was set up and some small plantations were raised during 1970-1971 and 1972. The plantations had failed and Mr. Saldana dropped these two series from his working plan. One of the primary reasons of destruction of forests is the working of fuel coupes in the natural forests areas.

5.4.4. In Government Lr. No. 13010/FRV/77-1, dated 22nd March 1977 and G.O. Ms. No. 1375 F&F department, dated 23rd October 1980, the felling of Natural Forests under any circumstances was banned. Work in the fuel working circle had stopped since 1977-78.

(b) *Timber working.*

5.4.5 The earliest working of the evergreen forests seems to have occured between 1799 and 1896, in the Scholas of Srivilliputhur Range. In view of the importancs of Sholas as protectors of catchment areas, the Roard of Revenue in its proceedings forest No. 512 Misc., dated 9-4-1913 ordered all Shola exploitation to be stopped. No further exploitation of the Srivilliputhur Sholas was undertaken till Mr. Lazarado's plan came into force (1934-1948) Mr. Lazarado consitted an area of 184 acres (74-05 ha) in the Chittar Valley as a seperate felling series to be worked on five year felling cycle.

5.4.6. Mr. Cariappa who revised the Working Plan of Mr. Lasrado rightly abandoned the working of the even green forests as he perceived the lack of sufficient trecs or exploitable girth and the fertility of such working in the absence of and regeneration in the small patches of sholas occuring in these forests.

The working of the sholas has been abandoned since then. The sholas will not be prescribed for worffing in this plan period also.

(C) *Bamboo*

5.4.7. The occurrence of bamboo in the Sri Villiputhur forests is exeremely sporadic. A few scattered hlumps occur at the mouth of Ayyanarkoil and Alagarkoil valley and in the Valaikulam Reserve. Extraction of the existing bamboos in the Ayyanargoil Valley was done during the

plan period of Messers. Lasrado and Cariappa (1934-1960) whenever there is a demand, but the coupes mostly went unslod whenever offered for sale.

5.4.8. Attempts at regenerating bamboos in Alagarkoil valley were made between 1903 and 1913 with little success. Though not prescribed in Thiru J. Wilson's plan an extent of 4.02 Ha. in Sappaniparambu reserve and along stream banks in Srivilliputhur Reserve were planted with Bamboo in 1963 These later attempts also were not easy successful.

5.4.9. Messrs. Wilson and Saldhana had decried the attempt to regenerate bamboos because of their sporadic occurance. Their conclusion is not well founded. Even the occurence of a single clump should lead to the logical conclusion of the possibility of raising a successful plantation. The cause of the failure really is the failure of those attempting the regeneration without being aware of how bamboo regenerates naturally. A clump is never formed from a single seedling. It is formed out of culster of seedlings that appears after seeding. Bamboo seedlings should hav been planted in patches of one chain or half a chain squares at 1.0m spacing in each of these patches. Even if the pheripheral seedlings had been damaged, the core 'plants would have survived and a large clumpwould have resulted within 3 years. Nature shows the way. The aggressiveness of lanthana, eupatorium, grass and wattle is not due to their size but to their gregariousness. Bamboos are not very particular about soil, so long as they are able to get moisture even from air. Water conservation measures to store up water for a longer period should have been done during the first 3 years of the plantation. Our plantations are poor yielders because we allow 99 per cent of the precipitation to go waste as run-off and evaporation. Next to air, water, is the most important natrual resources and raw material for the survival of all life and nothing can take the place of water in plant growth.

(d) Sandal regeneration.

5.4.10. The fair distribution of sandal in the Alagarkoil valley and the conspicous absence of spike prompted Mr. Lasrado to prescribe aritificial regeneration of this species in non-sandal areas in portion of Alagarkoil valley by raising small sandal propagation centres in clearings measuring 3.05 metres10 feet) square at the rate of 4 centres per beat. He also prescribed clearing of strips 3.05 to 4.57 meters (10 to 15 feet) *vide* one or two chain apart and diblling of seeds in the in the shade of bushes The prescriptions were not carried out properly. Mr. Cariappa prescribed the continuance of the propagation centres and these were not carried out properly. Mr. Wilson prescribed the continuance of the system but with an altered technique of transplanting nursery raised container plants in 30cubicmetr pits dug at espacements varying from 2.47mx 3.35mx 2.47m in sites cleared of undergrowth. Thiru Saldahana's working plan provided one planting series in Seithur and one felling series in Alagarkoil valley. Thiru Saldahana prescribed planting 1.0 Hectare annualy in Seither series in Seithur R.L. for 9 years from 1975 to 1983. In 1974, an area of 5.12 hactere was planted in Seithur R.L. No planting has been done since then. In Alagarkoil valley sandal series, extending over 1972.02 ha. consisting of 3 blocks, extraction of dead sandal trees is beirg done as per rules in force on a 3 year felling cycle

5.4.11. Since the blocks are small, it is not difficult to carry out the extraction of dead sandal trees and in all the 3 blocks annually. This will conduce to efficient protection frequent inspections and prevent deterioration of the dead sandalwood due to exposure in forest conditions. About 100 trees are extracted annually .The annual yield is about 3 M.T.

(e) Teak plantation.

5.4.12. Teak has been raised in Rajapalayam Range (formerly) part of Srivilliputhur Range over 223.34 Ha. in Deviar and Sollasseri localities in Seithur R.L., between 1956 and 1961. Thinnings prescribed for the plantations in Thiru A. Saldhana's Working Plan have not been carried out. The area is subject to serious wind erosion. Thinnings will not improve these plantations. Thinning is a negative operation. It aims at reducing trans'piration through reduction of stems to suit soil moisture. Far from making available extra soil moisture to the retained stems, loss of soil moisture. evaporation occurs through exposure we then get into the vicious circle of reduction soil moisture and to further reduction in the standing crop. Our effort should be to increse the production of plant matter by incresing soil moisture. Increasing soil moisture by adoptiong soil and water conservation measures. along will improve the growth and density in the area. This will apply to all plantations, already raised and to be raised. Soil and water conservation measures will be made the pre-requisite of every forestry operations in this plan.

(f) Softwood plantations.

5.4.13. Between 1958 and 1969, plantations of Ailanthus excelsa were raised artificially over an extent of 420.56 ha. in Seithur R.L. In Rajapalaym Range (formerely part of Srivilliputhur Range) to cater to the needs or the match industries in Ramanathapuram district. The survival varies from 32 to 69 per cent. Since the overall growth was found to be unsatisfactory except along stream banks and along the periophery of plantations, further planting was stopped. Thinnings prescribed in the Working Plan of Thiru A. Saldhana, have not carried out.

Thinnings will not improve this plantation. The fact that, good growth is fownd along stream banks an periphery of the plantations suggest measures to increase soil moisture. At present we are not even using 10 per cent of the annual precipitation increasing soil moisture is the immediate need.

(g) Tamarind plantations.

5.4.14. Though not prescribed in Thiru Wilson's plan, Tamarind plantations were raised over an extent of 217.31 ha. in Rajapalayam Range (formerly part of Srivilliputhur Range) 2.02 ha. in Kunnu beat of Srivilliputhur Range. 8.09 ha raised in 1958 in Piravadiar beat of Rajapalayam Range as a miscellaneous plantation has also been grouped with Tamarind plantations. Since the results in Rajappalayam Range was satisfactory, an additional area of 471.87 ha. in Seitbur R.L. of Rajapalayam was prescribed to be taken up for planningwith Tamarind in the plan of Thiru A. Saldhana during th eperiod from 1st April 1974 to 31st March 1984. Between 1974 and 1984, 275.30 Ha., in Seithur R.L. of Rajapalayam Range, 53 ha. in Srivilliputhur Range have been planted with Tamarind. Totally 384.3 ha. were planted against the prescribed area.

5.4.15. It appears that the stocking is fairly good in the first and second year of the plantations as there is attention and provision for casualty replacement. It is admitted that the one year old plants need attention in the second year for establishment. But this rule is not applied in the case of plants used for casualties in the second year. We must maintain out plantations carrying out replacements, weeding and soil working and given special protection for at least five years if we are to raise really good plantations. No pure plantation will be prescribed in this plan. Soil water conservation measures will be made the pre-requisite of every forestry operations.

(h) *Red sanders plantations.*

5.4.16. Red sanders was raised experimentally over an area of 8 ha., in Rengartheertham beat of Srivilliputhur Range in 1970 and over 10 ha., in Piravadiar beat of Rajapalayam Range in 1973. The areas were re-planted with Odai (Accacia planifrons) in 1980 and 1977 respectively, since red sanders did not come up to expectations.

(i) *Eucalyptus (Hybrid) tereticornis.*

5.4.17. Though not prescribed in Wilson's plan 4.85 ha., in Kunnur beat of Srivilliputhur Range and 136.67 ha., in Seithur R.L. were raised between 1962 and 1973. Again 154.52 ha., were planted with Eucalyptus hybrid in Pulveli in Pilavakal beat I of Srivilliputhur Range in the years 1974—75 to 1976-77. These were also not prescribed in the Working Plan of Thiru A. Saldhana, five series namely. Karaikudi, Thirupathur, Sivaganga, Srivilliputhur and Crash Plantation Project series, were constituted under Eucalyptus plantations working circle in Thiru A. Saldhana's plan (1974-84).

5.4.18. Though the rotation had been fixed at 8 years in Thiru A. Saldhana's working plan, the fellings are being done much latter as these plantations are being allotted to Thiruvalargal Seshashayee Paper Board (P) Limited, under orders of the Government of Tamil Nadu. A list of plantations so allotted and the yield obtained from them are furnished below :—

Serial number.	*Year.*	*Name of the plantation.*	*Area felled hec.*	*Yield M.T.*
1	1974	Pilavakal R.A.	80.90	1,711.500
2	1975	-do-	53.10	866.800
3	1976	-do-	10.10	44.000

(j) *Odai (Accacia planifrons).*

5.4.19. The total area of the working circle as constituted in Thiru A. Saldhana's working plan was 1,465.76 ha., The working circle was divided into 6 working circles including the isolated plantations in Kothakulam of Rajapalayam Range, Kunnur and Rengartheertham of Srivilliputhur Range and in Pamban village of Rameswaram Range. No areas were prescribed in these 4 series in Rajapalayam. Srivilliputhur and Rameswaram Ranges for felling or planting during Mr. Saldhana's working plan period.

In addition to these the following plantations have been raised during the years 1978 to 1980.—

Serial number.	*Range.*	*Species.*	*Extent in ha.*
1	Srivilliputhur	Odai ' Parambai '	35.00 ha.
2	-do-	Velvel	135.00 ha.
3	Rajapalayam	Odai & Velvel	50.00 ha.

5.4.20. *Minor forest produce.*—As against 27 farms prescribed in the working plan of Mr. A. Saldhana, there are now 31 farms from which the M.F.P., is collected by contractors and Tribal Co-operative Society.

5.4.21. *Grazing.*—The working circle covers the whole of the division with the exception of the area closed to grazing mainly for silvicultural reasons and occasionally for other reasons.

Forest grazing is regulated by the issue of grazing permits charged at the following rates :—

Description of Animal.	*Rate/head/annum.*
Sheep	Re. 1.00.
Cows and Bulls	Rs. 2.00.
Horses and Asses ..	Rs. 4.00.
Buffaloes	Rs. 4.00.
Elephants	Rs. 30.00.

The average annual revenue is only Rs. 22,192 which is very meagre and the loss to the forest in the form of destruction of the vegetal cover by trampling, overgrazing and soil erosion will amount to several million rupees.

SECTION 5—SPECIAL WORKS OF IMPROVEMENT.

5.5.1. The drought prone area programme, a centrally sponsored scheme is being implemented in this district from 1975 onwards'. Plantations, mostly of fuel and fodder are raised in the community lands. Plantations raised under this scheme are handed over to the social forestry division after two years of maintenance. The list of plantations raised under this scheme is furnished in appendix.

5.5.2 The details of wells dug and buildings constructed are furnished in the appendix No. X and XIII.

SECTION 6.

PAST-YIELD.

5.6.1. *Eucalyptus Tereticornis.*

Serial number.	*Year.*	*Name of the plantation.*	*Area felled.*	*Yield in tonnes.*
1	1974	Pilavakkal R.A.	80.90 ha.	1711.500
2	1975	do--	53.1 ha.	866.800
3	1976	-do-	10.1 ha.	44.00

5.6.2. YIELD OF SANDALWOOD FROM SRIVILLIPUTHUR RANGE.

Year.	*Name of series and block No.*	*Number of trees.*	*Yield in Kg.*		
			Rough cleaned wood.	*Final cleaned wood.*	*Sap wood.*
(1)	(2)	(3)	(4)	(5)	(6)
1960–61	Alagarkoil–III	147	5005.310	4466.930	114 000
1961–62	Alagarkoil–I	267	5678.730	5339.280	190.700
1962–63	Alagarkoil–II	427	7048.086	6210.800	109.000
1963–64	Alagarkoil–III	197	3405.000	3403.000	145.000
1964–65	Alagarkoil–I	619	5447.250	5655.500	229.100
1965–66	Alagarkoil–II	338	..	5909.560	264.000
1966–67	Alagarkoil–III	273	..	4637.000	217.900
1967–68	Alagarkoil–I	265	..	3460.000	64.300
1968–69	Alagarkoil–III	295	..	6483.400	159.000
1969–70	Alagarkoil–III	23	..	2788.000	28.275
1970–71	Alagarkoil–I	119	..	2432.000	896.574
1971–72	Alagarkoil–II	537	..	8512.000	178.400
1972–73	Alagarkoil–II	642	..	10142.000	5474.300
1973–74	Alagarkoil–I	188	..	3153.000	3626.300

5.6.2. SANDALWOOD.

Year.	*Name of the Section and Block.*	*Area in ha.*	*Yield.*					*Revenue during the year.*
			Root.	*Trunk.*	*Branch.*	*Dusts chips.*	*Total.*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1974–75	Alagarkoil–II	678.24	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1975–76	Athithondu–III	519.61	N.A.	..	..	..	3,375	N.A.
1976–77	Pudupatty–I	775.17	N.A.	..	..	..	2.867	316821.75
1977–78	Alagarkoil–II	678.24	N.A.	..	..	..	3,776	20373.40
1978–79	Athithondu–III	519.61	N.A.	..	..	..	3,720	206181.80
1979–80	Pudupatti–I	774.17	15	10	1	100	126	N.A.
1980–81	Alagarkoil–II	678.24	85	83	104	500	772	N.A.
1981–82	Athithondu–III	519.61	72	15	4	100	191	N.A.
1982–83	Puthupatty–I	774.14	49	8	24	105	186	N.A.
1983–84	Alagarkoil–II	678.24	299	96	18	..	413	N.A.

NOTE.– Not available.

CHAPTER 6.

STATISTICS OF GROWTH AND YIELD.

In Kamarajar division, there are not many good plantations. There are a few old teak plantations and some old Ailanthus excelsa plantations. There are no proper age gradations to form any meaningful statistical intrepretation on growth and yield. The stocking of these plantations also varies making the task of collection of statistics more difficult. Hence the data pertaining to Srivilliputhur R.F., as furnished in the Forest Resources survey report written by Thiru Mangalraj Johnson, is furnished in Table 6.1.

CHAPTER—6.1.

STATISTICS OF GROWTH AND YIELD.

SRIVILLIPUTHUR RANGE : Number of different species by girth classes in Srivilliputhur R.F.,

Total area : 17,900.35 Ha.

Intensity of sampling : 1 percentage.

Serial number.	*Species.*	*Girth classes in centimeters.*						*Total.*
		30—60	61—90	91—120	121—150	151—180	181—120	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Acacia leucophloea (Ve-Velam)	..	284	97	..	..	..	381
2	Acacia chundra (Rob) Wild	2,880	538	89	..	..	..	3,507
3	Achronychia laurifolia Blume	1,512	334	100	..	..	..	1,946
4	Adina cordifolia Hook	3,279	1,748	688	500	285	195	6,695
5	Ailanthus excelsa Roxb	605	127	183	..	..	..	915
6	Alangium salvifolium wang(Rinn.	3,915	760	200	200	..	..	5,075
7	Albizzia procera Benth	295	..	..	..	..	..	295
8	Artocarpus hirsuta Lam	100	..	..	..	..	..	100
9	Atlantis monophylia Roxb	2,745	700	..	..	..	..	3,445
10	Azadirachta indica A Juss	644	181	82	82	..	125	1,114
11	Bauthinia racemosa Linn	9,605	2,529	600	127	100	100	13,061
12	Bridelis retusa spreng	9,529	6,085	1,801	1,228	100	..	18,743
13	Buchananis lanzan spreng	2,040	720	400	100	100	..	3,360
14	Butes frondoss koen	14,968	8,666	1,816	606	..	160	26,216
15	Canthium umbellatun Wt	914	360	100	127	..	..	1,501
16	Careya arbores Roxb	4,495	3,217	479	698	..	..	8,884
17	Cassia fistula linn	666	287	..	..	..	..	953
18	Celtis tetrandra Roxb	12,752	6,351	3,475	1,181	681	100	24,540
19	Celtis wightii planch	18,973	15,085	2,950	710	455	..	38,173
20	Chlorexylon swienetia D.C.	1,459	1,042	49	..	..	..	2,550
21	Commipbora berryi Arn	44,269	6,600	384	100	..	..	51,383
22	Commiphora caudata (W & A) Engl.	20,377	14,438	2,103	299	..		37,217
23	Cordis dischetoma Forst-f	3,334	749	..	..	..	..	4,083
24	Chchlospermum religiosusm linn	5,454	2,921	1,510	..	..	..	9,885
25	Cordis wellichi G..	700	100	..	..		100	900
26	Gratseva murvals Buch-Nam	2,667	1,363	627	..	..	..	4,657

Serial number.	Species.	Girth classes in centimetres.						Total.
		30—60	61—90	91—120	121—150	151—180	181—210	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
27	Croton oblongifolus Roxb	300	586	..	..	162	..	1,048
28	Cullenis resayraona Kostermans	..	..	..	..	100	..	100
29	Cyclostemon malabaricus bedd	2,072	266	133	..	..	..	2,471
30	Dalbergia latifolia Roxb.	3,549	1,051	460	200	..	..	5,260
31	Dalbergia paniculata Roxb	11,716	5,859	3,103	492	400	100	21,670
32	Diospyres montans Roxb	760	300	200	..	..	..	1,260
33	Diospyres species Linn	4,389	1,800	589	..	..	..	6,778
34	Dispyres species Linn	2,062	1,976	695	298	..	..	5,031
35	Delichandrone strovirens	3,221	2,536	563	..	63	36	6,419
36	Drypates sepiaria	2,782	1,098	399	36	36	28	4,379
37	Dichrastachys cinerea	100	..	..	..	..	..	100
38	Enretia ovalifolia WT.	..	..	100	..	..	..	100
39	Emblica officinalis Gaertm	6,021	2,392	693	131	..	..	9,237
40	Erythroxylon monogynum Roxb	314	..	..	..	..	..	314
41	Erythrina suberosa Roxb	100	..	100	..	..	..	200
42	Feronia limonis Swingle	196	..	..	..	..	..	196
43	Ficus hispida Linn	62	..	..	..	..	..	62
44	Ficus mysorensis Heyna	..	200	..	..	..	..	200
45	Ficus religiosa Linn	200	..	..	..	100	..	300
46	Gardenia gummifers Linn	2,937	640	100	..	..	..	3,677
47	Gmelina arbores Roxb	1,529	549	300	..	..	..	2,378
48	Gmelina asiatica Linn	1,606	320	300	..	..	..	2,226
49	Grewia species Linn	..	100	..	..	..	..	100
50	Grewia species Linn	7,972	2,927	1,074	..	..	..	11,973
51	Grewia tillisefolis Vahl	14,866	5,901	1,160	468	..	..	22,395
52	Hardwickia binata Roxb	305	187	..	..	..	..	492
53	Hopes perviflers Bedd	200	100	200	..	100	..	600
54	Hymenodictyon excelsum Wall	200	200	200	..	..	..	800
55	Ixora arborea Roxb	2,700	740	185	100	..	..	3,725
56	Ixora noteniana Wall	..	101	..	..	..	..	101
57	Lagerstroemia lanceolata Wall	..	400	100	..	200	..	700
58	Lannes coromsandelica	2,978	1,611	778	201	100	..	5,668
59	Lapisanthes tetraphylloa Radik	860	415	85	..	100	..	1,460
60	Limonia acidissims Linn.	1,071	100	100	..	..	..	1,271
61	Limonis alata W & A.	3,999	100	100	..	..	..	4,199
62	Maba burifolis pers	600	..	..	100	..	..	700
63	Machilus macrantha Nees.	700	200	..	..	..	..	900
64	Macranga roxburghii Wt.	686	200	1,534	524	200	..	3,144
65	Madhuca indica Gmel	174	..	..	..	..	..	174
66	Mallotus philipensis	10,944	3,509	300	100	..	..	14,853
67	Manikaras hexandra Roxb	2,360	900	700	400	..	..	4,460

Serial number.	Species.	Girth Classes in centimeters. 30—60	61—90	91—120	121—150	151—180	181—210	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
68	Morinda tinctoria Roxb	1,685	1,200	200	..	..	..	3,085
69	Moringa eleifers Lank 69	3,194	3,485	1,430	630	..	101	8,810
70	Murraya Koenigi spreng 71	..	162	..	..	..	..	162
71	Murraya paniculata 76	100	100	..	..	..	..	200
72	Hephelium bifolistim Bedd	4,093	2,891	14,28	500	100	28	9,040
73	Niebuhria apetala..	100	..	..	..	..	..	100
74	Ochna squarrosa Roxb	2,303	649	227	..	100	..	3,279
75	Olea glandulifera Wall	400	400	300	..	..	..	1,100
76	Olea species Linn	2,171	1,638	1,278	956	100	..	6,143
77	Plumeria rubra Linn	700	..	200	100	..	..	1,000
78	Polyathia cerasodies	8,043	1,678	405	..	..	..	10,126
79	Pongammia pinnata	..	95	195	100	..	..	290
80	Premna tomentosa Wilids	712	..	..	..	..	..	712
81	Radermachera Xylocarpa	518	572	300	200	..	..	1,590
82	Randia dumstorum Lam	428	100	..	..	..	..	528
83	Randia species Linn	2,494	493	100	..	..	..	3,087
84	Randia ulginesa D.C.	100	..	..	..	..	..	100
85	Rhodidendron nilagiricum	..	93	417	93	255	..	858
86	Rhododendron nila tetresperma Roxb	185	100	..	..	..	..	285
87	Salmalia malabarica	1,904	2,546	1,787	634	200	..	7,071
88	Santalum album Linn	2,844	204	100	..	..	..	3,148
89	Sapindus emarginatus Vahl	16,743	4,487	918	..	..	..	22,098
90	Scalopia crenata Clos	262	100	724	162	..	..	1,248
91	Scheiechera Cleces	417	351	..	100	..	..	868
92	Semecarpus anacardium Linn	..	40	..	..	..	..	40
93	Spondias Pinnata	..	..	100	..	..	..	100
94	Streblus asper Lous	14,804	1,668	100	..	..	..	16,672
95	Strychnos nux-vomica Linn	1,680	323	100	..	..	..	2,103
96	Strychnos portatorum Linn	23,218	5,228	927	100	..	..	29,473
97	Symplocos laurina (Ratz) Wall	..	..	100	100	..	..	200
98	Tectona grandis Linn	75,441	44,435	13,116	2,760	1,332	168	1,37,262
99	Terminalia arjuna Wat A.	..	200	100	..	..	..	300
100	Terminalia Chebule Retz	5,411	4,847	2,287	792	400	200	13,034
101	Toddalixs asiatica Linn	..	36	..	..	..	..	36
102	Trema orientalis B	1,150	500	..	210	..	..	1,860
103	Viburnum coriaceum	300	500	..	..	..	..	900
104	Viburnum coracoum Bl	300	500	..	..	100	..	900
105	Vitax altissima Linn	900	566	848	100	..	200	2,614
106	Vitax negunde Linn	500	..	..	..	..	..	500
10	Wrightia tinctoria	1,818	351	100	..	..	..	2,269
	Zizyphus Xyloyrups Willd	9,821	1,864	622	52	..	..	12,359

59 1—11

PART—I

CHAPTER—VII

ESTIMATE OF CAPITAL VALUE OF THE FORESTS

General.—Forests constitute an important and indispensable natural resources for the Government. They play a vital role in the economy and general welfare of the people, yielding a variety of produces such as timber, firewood, green-manure, paper pulp, material for rayon, chip-boards, tanniu essential oils and a host of other produces including minor forest produces. They play an indispensable role in controlling floods, and soil wash. They help to maintain the balance of ecology, ensure un-interupted supply of water in rivers and streams and reduce environmental pollution. Due to the population explosion in the last few decades considerable areas of forests are exploited to the maximum which resulted in the degradation of forests. Within 35 years of our independence the nation has lost about 4.5 million hects of forest area for non-forestry purposes. But when the area under forest is decreasing, the dependence on forest and forest raw-materials and products is mounting.

The increased dependence of forest and its forest raw-material by the various industries such as paper and rayon, leather industries, etc., the ill effects such as erosion, lands slide, avalanches, flash floods, etc., which are direct results of devastation of forests—the increased air, water and noise pollution due to fume and flames from factories, chemical and poisioness refuges from mills and emition of highly corbonised gases from large number of automatives coupled with noise and the gradual alienation of forest areas for non-forestry purposes, etc., led to the new awakening among environmental lists all over the world to create more and more man made forests apart from the natural forests. This shows that the value the forests is of incalculable. Any how as a wealth and main stay of income to the Government the forest has got a capital value as any other property.

As the custodian of the forests, Forest Officer has to know or an assessment of the capital value of the forest under his control. But it is difficult to form an accurate estimate of the capital value of the forests, since all the forests are the property of the Government and the benefits derived are both direct and indirect as explained above.

Estimating the capital value of the forests taking into consideration the annual revenue and expenditure for the past some decades as was done by Thiru E. A. Lasarado, I.F.S., for Tirunelreli-*cum*-Ramanathapuram forest division could not be worked out for Kamarajar forest division. This is because the present Kamarajar Forest division is a portion of the erstwhile Ramanathapuram forest division and that to it comprises only the Srivilliputhur Range of Ramanathapuram Forest Division which was bifurcated !nto the present Srivilliputhur and Rajapalayam Ranges. rhe annual revenue and expenditure particulars for the Errtstwhile Ramanathapuram division shows only deficit. The following statement gives the above particulars for the years from 1960—61 to 1986-87.

Year.	*Revenue. in Rs.*	*Expenditure. Rs.*	*Surplus. Rs.*	*Deficity. Rs.*
1960-61	2,47,292	3,10,636	..	63,344
1961-62	3,74,489	3,89,602	..	15,113
1962-63	3,39,946	4,56,039	..	1,16,093
1963-64	4,17,234	4,96,998	..	79,764
1964-65	2,72,000	5,52,743	..	2,80,743
1965-66	4,20,281	5,40,309	..	1,20,028
1966-67	3,69,864	5,69,152	..	1,99,288
1967-68	5,81,414	4,69,369	1,12,045	..
1968-69	3,63,229	7,05,782	..	3,42 553
1969-70	4,95,6°8	8,35,866	..	3 40 178

Year.	*Revenue in*	*Expenditure.*	*Surplus.*	*Deficit.*
	RS. PS.	RS. PS.	RS. PS.	RS. PS.
1970-71	5,84,937.00	8,68,941.00	..	2,84,004.00
1971-72	6,89,194.00	10,40,684.00	..	3,51,490.00
1972-73	11,85,589.00	10,20,276.00	1,65,313.00	..
1973-74	14,05,867.00	18,18,056.00	..	4,12,189.00
1974-75	N.A.	N.A.	N.A.	N.A.
1975-76	N.A.	N.A.	N.A.	N.A.
1976-77	36,127.90	50,301.37	..	14,173.47
1977-78	N.A.	N.A.	N.A.	N.A.
1978-79	2,04,694.43	2,04,694.43	..	..
1979-80	49,350.45	1,07,922.74	..	58,572.29
1980-81	5,53,647.76	5,59,917.46	..	6,267.70
1981-82	10,08,541.80	10,08,541.80	..	..
1982-83	10,52,856.95	10,13,853.90	39,003.05	..
1983-84	N.A.	N.A.	..	..
1984-85	N.A.	N.A.	..	..
1985-86	N.A.	N.A.	..	..
1986-87	15,79,891.10	18,32,163.34	..	2,52,272.24

N. A.: Not Available.

From the above statement it is very clear that there is over deficit eventhough there were surplus in two years. The deficit was mainly due to the large scale afforestation works and various improvement works such as Intensive Cultural Operation ect., executed in planting areas under various schemes. Moreover as almost all the cashew bearing areas were handedover to TAFORN on lease the remaining areas are not very pnoductive as in the case of cashew. So the method adopted by Thiru E. A. Lasarado, I.F.S., for the estimation of the Capital value of Forests could not be adopted for this Division.

For Kamarajar forest division the capital value of Forests is estimated by adopting different rates per unit area for growing stock in the natural forest area, plantation area, and different land cost for the above two areas. In order to know the area under natural forest and plantation the total area of the division is divided accordingly in the following statement.

STATEMENT SHOWING THE AREA UNDER NATURAL FOREST AND PLANTATIONS IN KAMARAJAR FOREST DIVISION.

Serial number.	Name of the Range.	Total extent of range in Hect.	Extent of plantations in Hectares.					Total extent of plantations in Hects.	Balance unplanted natural forests in Hects.
			Teak.	E.H.	Tamarind.	Match-wood.	Misc.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Srivilliputhur	17,910.47	..	176.72	54.00	..	582.41	813.13	17,097.34
2	Rajapalayam	8,614.69	336.58	140.17	57.42	482.16	..	1,016.33	7,598.36
	Total ..	26,525.16	336.58	316.89	111.42	482.16	582.41	1,829.46	24,695.70

NOTE.—The area of totally failed plantations are included under un-planted natural forest area for calculation of capital value of the forest.

1. *Value of growing stock* :—

(*a*) For natural forest—Among the available natural forest area of 24,695.70 hectares about 30 percentage of area consists only baren rock. The balance 70 per cent area consists of moist deciduous, dry deciduous and ever-green forests with valuable timber species. So an average rate of Rs. 500 per hect. is fixed for the whole area. So the value of growing stock in natural forest area works out to.

24,695.70 x 500 — Rs. 1,23,47,850.00

(*b*) For plantation—As the plantations are of Teak with poor stocking, match-wood, tamarind, E.H. and miscellaneous speeies and average rate of Rs. 2,500 per hec. is fixed. This works out to.

1829.46 X 2,500 — Rs. 45,73,650.00.

2. *Land cost*.—

(*a*) For natural forests.—In this above 30 percentage of the area consists only baren rocks. The land cost varies from Taluk to Taluk and from village to village based on the fertility of the soil as per revenue records. Hence with reference to revenue records an average rate of Rs. 3,000 per hectare is fixed for this. This works out to.

24,695.70X3,000—Rs. 7,40,87,100.00.

(*b*) *Plantation*.—The plantations are raised along the foot hills which holds soil to a considerable depth. The miscellaneous plantations are raised on small karadu. As this portion is of better type than the land under natural forest the average rate per hectare fixed is Rs. 7,000. This works out to.

1,829.46X7,000—Rs. 1,28,06,220.00.

3. *Cost of buildings*.—Rs. 2,35,332.45.

4. *Cost of wells sunk*.—Rs. 20,615.00.

5. *Cost of formation of roads*.—Rs. 52,240.68.

Abstract.

1. *Value of growing stock* :—

(*a*) For natural forest	..	Rs. 1,23,47,850.00.
(*b*) For plantation ..	..	Rs. 45,73,650.00.

2. *Land cost* :—

(*a*) For natural forest	..	Rs. 7,40,87,100.00.
(*b*) For plantation ..	..	Rs. 1,28,06,220.00.
3. Cost of buildings ..	..	Rs. 2,35,332.45.
4. Cost of wells sunk ..	..	Rs. 20,615.00.
5. Cost of formation of roads	..	Rs. 52,240.68.
Total	..	Rs. 1,041,23,008.13
		or
		1,041.23 lakhs.

PART - II.

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED.

CHAPTER - 8.

BASIS OF PROPOSALS.

SECTION - 1.

General object of Management.

1. Goals.

8.1.1. Preserving and upgrading all the existing natural forests, greening of the degraded forest lands, upgrading the existing production forestry component for improving their productivity enabling a sizable number of poor families to cross the poverty line annually and developing eLergy wood resources to meet the requirement of at least 10 per cent of the population over a period of 10 year constitute the important goals.

2. Objectives.

8.1.2. *Main objectives include* :

(i) To preserve the entire natural forest eco-systems in this tract, and to promote their potential expression to eventual upgradation to nature eco-systems.

(ii) To restore the vegetation in the ecologically sensitive hill forests that are unsuitable for wood production to enable it to play an effective protective role for the maintenance of the ecological balance in the region.

(iii) To afforest the sociologically sensitive forest areas that are constantly in public view either on the road sides or in picnic spots, in such a way that it caters to the visual needs of the people.

(iv) To develop the forests as an infrastructural facility for the production of various kinds of inputs to other primary production systems ; Water, wood for implements and green leaf manure for agricultural production ; fodder for live-stock production.

(v) To improve the productivity of the production forestry component energy wood, by adopting intensive methods of afforestation, maintenance and management and meet the energy wood requirements of the local population.

(vi) To maintain the beneficial relationship between land and water cycle by arresting soil erosion and harvesting water to improve the production of the dry land agriculture and by adopting integrated water shed management.

(vii) To attack the rural poverty manifested in the form of unemployment and disguised unemployment by deploying the wasted human resources in developing the wasted land resources by re-clothing with vegetation thereby generating employment and income to rural poor.

(viii) To strive for the people's participation in decision making in planning and execution of afforestation works in the protection of forests and to develop a forest conservation consciousness among the people.

3. Strategies.

8.1.3. (i) Identification of the natural forest areas whose potential for natural re-clothing has not been permanently impaired and restoration of the original eco-systems by encouraging and promoting natural regeneration wherever the potential for re-clothing exists and by under-taking artificial regeneration through seeding and planting of perennial vegetation crops wherever necessary.

(ii) Reducing the poverty profile of this region by creating employment opportunities on a sustained basis by engaging the rural poor in raising, the establishment, maintenance and management of tree based assets and in harvesting, processing transport and trade of the forest based produce like bio-mass fuel, fruits, oil seeds etc.

(iii) Improving the water storage position of the tanks and wells by increasing the ability of water shed to hold back rainwater by forming percolation ponds thereby augmenting the water resources for drinking and agricultural purposes which will transform the traditional agriculture to modern intensive agriculture.

(iv) Meeting the rural needs by appropriate choise of tree species and other perennials which will be acceptable in the existing physico-climatic setting and social economic back drop.

(v) Constitution of production oriented or goods oriented working circles for effective utilization of the forest lands that are fit for production forestry without affecting the protective role for generating goods to augment the forest resources that are needed by the peeple.

(vi) Ensuring peoples participation by forming village committees for creating a social fencing for affording effective protection, and by encouraging village co-operative societies for scientific harvesting and utilisation of the forest produce.

SECTION—2.

WORKING CIRCLES, THEIR AREA AND DISTRIBUTION.

1. **Criterion for Allocation.**

8.2.1. As envisaged in the objectives and strategies two categories of working circles are created based on the role that the forests are expected to play in a each area, in order to make a permanent distinction between protective role environmental and ecological security and water security and productive role (production of wood and non wood products) of the forests depending on the capability of the site and in relation to other land uses in the existing phsio-climatic setting of the region. They are protection oriented working circles and production oriented working circles.

8.2.2. Before allocating the various R.Fs., and R.Fs between 2 categories of working circles some questions were critically evaluated ; Is this R.F./part of this R.F. it for production oriented working circle ? Can this R.F.-part of this R.F., be put under production oriented working circle ? Is this R.F., part of this R.F., capable or supporting production forestry ? Wherever the answer to these questions were found to the negative they are all allocated to the protection oriented working circles and wherever the answer to these questions were found to be positive they are all allocated to the production oriented Working circles. Hence in allocating varoious R.Fs., for different uses the protective role has been given primacy over the productive role.

8.2.3. Normally the forests play both protective role. Depending upon the capability of the forest land in a particular physico climatic setting the role is decided. Here the term " protection " refers to the ' protection ' afforded by the forests to other land uses and hydrological structures. It refers to the ' services ' afforded by the Forests, commonly designated as ' forest influences '. Thus the ecological Environmental and hydrological security afforded by the forests are referred to as protective role which is absolutely essential for all kinds of production in any region. Hence the maintenance of the ecological balance and environmental stability is of vital necessity for the growth of all the three sectors of economy in the region.

8.2.4. In the production forestry, unlike in the case of protection forestry, production of wood and non-wood forest products are the main concern. Production is not at the cost of the protective role, but in addition to it. Only those sites which are capable of combining protective and productive role are allocated to this category of working circle.

2. **Protection—Oriented Working Circles.**

8.2.5. While allocating various forests within the protection oriented working circles, the prioritisation has been done on the following order.

8.2.6. All the natural forests that are to be preserved have been allocated to the eco-preservation working cricle. The tropical evergreen and semi evergreen forests that are existing in the sholas in the upper Ghat slopes, and the jofests found in the Ayyanarkoil Valley and Alagarkoil Valley come under this working circle.

8.2.7. Second priority is given to the Wild Life Habit improvement working circle. The Grizzled giant squirre are found only in this division especially in the Alagarkoil valley. Apart from this there are Elephants and the Nilgiris Tahrs. So the following three schemes come under this working circle.

Grizzled giant squirrel habitat preservation and (i) improvement.

(ii) Elephant habitat preservation and improvement.

(iii) Nilgiri Tahr habitat preservation and improvement.

8.2.8. Third priority is given to water shed management Working circle, in order to augment the drinkimg water-supply to the urban areas of Rajapalayam and Srivilliputhur.

8.2.9. In all the Working circles under this category, goods production is not the priority criterion. However minor oil seed trees, fruit trees of cheap fruit varieties fibre and floss yielding plants etc., can be given preference in choice of species excepting the eco-preservation working circle. In addition to effective protective role, these Minor Forest Produce trees can yield some useful materials that can be collected by local people. Some of the pod yielding fodder trees can be given importance for making available some fodder pods to the local cattle population.

8.2.10. Thus the following working circle are constituted under this category :—

1. Eco-preservation working circle.
2. Wild-Life Habitat improvement and preservations Working Circle.
3. Water shed management working circle..

Production—Oriented Working Circle.

8.2.11. In this category, all the forest areas that can be safely put under production forestry for the production of goods including energy wood, timber and other minor Forest Produce are grouped.

8.2.12. In this category all the existing Eucalyptus hybrid plantations, Odai plantations, Miscellaneous Minor Forest Produce and Soft wood plantations are included. Accordingly the following working circles are constituted :

(i) Energy wood working circle.

(ii) Teak working circle.

(iii) Matchwood working circle.

(iv) Silvipasture working circle.

8.2.13. While allocating areas among the various working circles the need of the adjoining rural and urban population is taken into account. There is a high demand for fuel wood and infact fuel wood is being brought in from outside. So the first priority is given to energy wood working circle.

8.2.14. The second priority is given to the matchwood working circle since there is a booming industry of matchwood in Sivakasi and the demard for match wood is high; all the existing softwood plantations come under this working circle.

8.2.15. The third priority is given to teak working circle. All the best teak plantations and natural eak bearing areas are included in this crcle.

8.2.16. The last priority is given to the timber productions and teak working circle. Only the existing best teak plantations and natural teak bearing areas are included in this working circle.

In addition the following overlapping working circles are constituted :

(i) Sandalwood working circle.

(ii) M.F.P. Working circle.

Thus the details of working circles constituted are as follows :—

WORKING CIRCLES AND THEIR AREA.

Serial number and name of the Working Circle.	*Area in Hectares.*
(1)	(2)
1. Eco-Preservation working circle ..	15,174
2. Wild-Life habitat improvement Working circle.	15,174*
3. Water shed management working circle.	3.000
4. Energy wood working circle	2,000*
5. Teak wood working circle	225
6. Matchwood working circle	420
7. Silvi-pasture working circle	900
8. Sandalwood working circle	1972*
9. M.F.P. Working circle	*

*overlapping.

SECTION—3.

PERIOD OF WORKING PLAN.

8.3.1. The working plan period of Thiru A. Saldhana ended on 31st March 1984. As the composite Ramanathapuram division was bifurcated into two divisions namely Pasumpon Muthuramalingam-*cum*-Ramanathapuram Division and Kamarajar Division, a new plan proposed for the areas coming under Kamarajar Division. Accordingly the revision was taken up in April 1986 and completed in December 1986. Hence the years, 1985 and 1986 are to be treated as plan holidays. Hence the period of this plan shall be April 1987 to March 1997.

CHAPTER - 9.

ECO-PRESERVATION WORKING CIRCLE.

SECTION—1

General Constitution of working Circle and Character of Vegetation.

A. **Goals.**

9.1.1. To preserve the natural forest eco-systems of tropical evergreen and tropical deciduous forest types mainly found in the sheltered valleys of Ayyanarkoil and Alagarkoil and in the top one third region of the entire stretch of the western ghats in this tract.

B. **Objectives.**

9.1.2. (i) To preserve the fauna and flora of the natural forest areas in order to conserve the genepool.

(ii) To protect the entire natural vegetation. in order to maintain a beneficial relationship with hydro-logical cycle for the development of the entire watershed.

C. **Strategies.**

9.1.3. The strategies shall include the demarcation of all the undisbursed or less disturbed natural forest ecosystems and affording effective protection by minimising or preventing the biotic interference in all such areas.

D. **Character of Vegetation.**

9.1.4. The forest areas included are the sholo forests part of grass lands in the top most region of the hill ranges and the most valley bottoms in the Alagarkoil valley, Ayyanarkoil valley and in a few Pockets in Seithur R.L. vegetation is by and large closed forests with a variety of fauna and Flora. As discussed elsewhere some of the unique species found here include the gizzled giant squirrel,and the endangered species include the Nilgiris Thar and the Elephants. A variety of colourful insects including batterflies are also found. The various forest area harbour a host of medicinal plants: some of them are being alredy collected by the Medicinal farm situated at the entrance of the Alagakoil valley. There is urgent need to conserve, the entire genepool in view of the decline' experienced in the tropical forest areas not only the nation level but also at the international level.

SECTION—2.

Allotment of areas (in hectares).

	Srivilliputhur Range.	*Rajapalayam Range.*	*Total.*
(1)	(2)	(3)	(4)
A. *Closed forests* :			
1. Shola vegetation ..	960	2,100	3,060
2. Tropical deciduous Forests.	2,430	300	2,730
B. *Non-closed forests* :—			
(1)	(2)	(3)	(4)
3. Grass land ..	3,600	3,984	7,584
4. Rocky area ..	1,300	500	1,800
Total ..	8,290	6,884	15,174

The forest areas allotted to this working circle are mostly the closed forests of Shola vegetation and deciduous vegetation. However the rocky and grassy areas in the top one-third region of the hill range is also included, mainly because of the shola vegetation being found scattered in pockets in these grassy and rocky areas.

SECTION—3.

Methods of Treatment.

9.3.1. *Compartmentalisation.*—Areas allotted to this working circle are given in Section 2. Wherever the size of the compartments is large the same may be fragmented to suit the convenience of management. The various compartments allotted to this working circle may be demarcated by planting of root suckers of Agave Veracruz.

9.3.2. *Protection.*—The existing protective staff may be strengthened by adding permanent protection mazdoor wherever necessary. All round compartments/Sub-compartments trench/mound method of protection may be adopted.

9.3.3. *Clearing.*—Clearing should not be done in any of the areas allotted to this working circle. Clearing is totally prohibited.

9.3.4. *Choice of species.*—The choice of species should be the native species that were originally existing in the various compartments allotted to this working circle. The choice of species for enriching the various areas allotted to this working circle should be restricted to the native species that are found in the various compartments.

9.3.5. *Sowing of seeds.*—Enriching of the existing eco-system should be done by sowing of the seeds of the selected native species as planting saplings or seedlings may involve clearing of the existing of frowth. Hence planting is not prescribed repeated sowing of seeds of various species are prescribed till a closed forest canopy is formed. The strategy should envisage not only sowing of seeds but also complete protection. However planting can be done without clearing even a blade grass. Planting of balled saplings may be restored to without clearing. Repeated sowing of seeds have to be undertaken till the restoration is completed.

9.3.6. *Felling.*—Felling of trees should not be allowed from any of the areas allotted to this working circle. It should be remembered that these areas are the vestigial remnants of the original forests type that were native of this locality. Hence they have to be preserved at any cost.

9.3.7. *Grazing.*—Grazing should not be allowed in any of the areas allotted to this working circle.

SECTION 4.

9.4.1. *Control*.—A control journal a control book. plantation and nursery journals, a record of works and control maps will be maintained for this working circle. This should be posted soon after the close of each financial year. The posting and maintenance of control records and maps is a matter of vital importants and must receive the personal attention of the District Forest Officer.

9.4.2. *Control journal* .—The Control journal will give a detailed account of the management of the Range. The object of this journal is secure a running commentary on all objects of administration specially on the extent to which the object of the working plan have been realised and the extent to which the method prescribed have been found suitable in the control book and the records of works. The journal is intended to be given the District Forest Officer an opportunity for recording suggestions for modifications and improvements in the methods of working laid down in the working plan. The journal should therefore be taken into camp by the District Forest Officer and critical observations should be recorded in it during or after inspection. The control journal is a technical record and must be personally maintained by the District Forest Officer. A copy of the entries made during the year should be submitted to the Conservator of Forests soon after close of each financial year along with copy of the deviation statement, the control forms and Maps. All the works carried out under the prescription of the Working Plan as well as such measures as are neither prescribed nor suggested but are carried out should be recorded in this form " record of works ".

9.4.3. *Plantation journal* .—A plantation journal will be maintained which should contain the name and the year of plantation, its location area, the nature of the previous growth the revenue obtained by clearing growth the details and cost of formation of the plantation and further history like thinning and revenue realised thereby.

9.4.4. *Nursery journal* .—A nursery journal will be maintained for each years nursery showing its location and number, size of beds species sown origin, date of sowing nursery technique adopted watering regime, cost of maintenance, etc.

Both the nursery journal and plantation journal will be maintained personally by the Range Officer, Inspecting officers will note their remarks on these journals which will be replied to by the Range Officer. Copies of the journal will be maintained at the District Forest Office also.

9.4.5. *Control Maps* .—Control maps should show all operations actually carried out in connection with the exploitation in each series as per prescriptions of the working plan as well as such measures as are neither prescribed nor suggested but are carried out.

So the control maps should be a convenient scale of the areas annually regenerated with name of the species planted and with the dates of original planting and they should kept as bound register at District Forest Officer's Office. Sample control forms to be posted by the end of each financial year for this working circle are appendeds

SECTION 5.

Other regulations.

9.5.1. *Fire protection* .—Fire lines has to be maintained all around the shola forests wherever there is danger of fire from the native grasses and other vegetation.

9.5.2. *Penning*.—Penning of local cattle inside these forest areas should not be allowed. Penning of the cattle inside the forests is a clear cut license for the destruction of the genepool of this region and hence cattle grazing or penning of cattle should not be allowed. If the ban on penning creates sociological problems, the silvipastoral facilities proposed in this plan may be restricted for those cattle which were traditionally allowed for penning inside the forests. Penning of cattle in the higher reaches negatively interferes with the needs of the elephants and the Nilgiri Tahr.

9.5.3. *Closing the paths* .—In some areas there are paths through which are men and cattle reach these forests Trenches may be dug in various places in the path, in such a way that it discourages the men and cattle from reaching these forests.

CHAPTER - 10.

WILD-LIFE HABITAT IMPROVEMENT WORKING CIRCLE.

SECTION - 1.

General Constitution of the Working Circle and Character of Vegetation.

10.1.1. *General remarks* : 'Wild Life' are out heritage and it is one of our fundamental duties to conserve the wild life. Human survival is dependant on the conservation of Wild Life as man is a component of eco-system. So Wild Life are not just a beautiful whim of Nature but an indispensable link in the web of inter dependance Conservation movements should gather momentum now before more species of animals disappear from our world. This working circle aims at conserving the wild life especially the mammalian fauna of this place.

10.1.2. *Objects of management* : To initiate specific measures to improve the habits of the Grizzled giant squirrel (a unique species found in this tract), the elephants and Nilgiri Tahr in order to conserve these magnificient wild life which are increasingly being threatened with extinction. These measures proposed will automatically improve the whole forest eco-system in this region.

10.1.3. *Character of vegetation*.—The forest type included are mostly the grass lands in the top most reaches of the hill ranges where "Nilgiri Tahr" is leading a disturbed life and the degraded tropical mixed deciduous forests spread over the entire division. These constitute the habitate of the elephant and the high forests of mixed deciduous type in the Alagarkoil Valley constitute the habitate of the Grizzled giant squirrel. In some areas the vegetation is closed forests dominated by a single species of Gyrocarpus jacquini and in other areas or forests are either open type or of scrub vegetation. The ecological boundary of the elephants and the Grizzled giant squirrel are not confined to the legal Reserve forest boundry ; but extend beyond the legal boundary.

The Grizzled giant squirrel is leading a disturbed life in the Shenbagathope area of the Srivilliputhur Temple land where serious damage is caused to the habitate and ecological niche of this squirrel because the collection of minor Forest Produce items. The collection of mango and tamarind involves climbing the trees and shaking and breaking the branches which results in dismantling the nests of the squirrels thereby driving them into places which are unsafe. The collection of Minor Forest Produce also deprives them of their food items as man's greed knows no bounds.

The elephant habitate has also been degraded in many places and its corridor constitute the entire stretch and sometime they stray out side the R.Fs., of Rajapalayam and Srivilliputhur Ranges. They have started invading the agricultural lands and cause considerable damages to the field crop. The habitate of the Nilgiri Tahrs. Grassy rocky areas in the top most reaches of the Western ghats particularly in the areas of Mudaliaruthu is being repeatedly subjected to forest fires caused by the cattle graziers. It is unfortunate that penning of cattle is being allowed in these ecologically fragile areas. The habit of penning cattle in such areas shall not be allowed under any circumstances. The Nilgiri Tahr should be allowed to lead a peaceful life with no competition from cattle.

Agave planting has been prescribed in the periphery under miscellaneous regulations. Aerial seeding is prescribed, Modalities shall be worked out by the District Forest Officer as this method of serial seeding is still in the infancy stake broad outline of area details are furnished in the plan. Details are marked in the map.

SECTION - 2.

Allotment of area.

10.2.1. This is an overlapping working circle and encompasses almost the entire area of the tract. The areas constituting the habitate of all the three species are given below :—

1. Elephant corridor	..	Elephant corridor constitutes the entire forests and also some time they stray outside the R.Fs.
2. Grizzled Giant squirrel.		A linear strip in Alagarkoil valley of Srivilliputhur Range and Shenbagathope area of Srivilliputhur Temple land.
3. Nilgiri Tahr zone	..	Top one third reaches near Mudaliaruthu.

SECTION - 3.

GRIZZLED GIANT SQUIRRELS.

10.3.1. Grizzled giant squirrel survives only in the linear strip all along the river margins where an anboreal pathway is existing in the tall trees dominated forest patch. As these areas were excluded from felling in the previous coupe working. There is reason to believe that its vast habitate of past have shrunk in size due to felling of trees. Accordingly its population have also declined and the present number is hardly about 100.

10.3.2. *Feeding behaviour*.—Grizzled giant squirrel is mainly a frugivorous species. From the observations recorded in the Alagarkoil Valley, these grizzled squirrels have got a special preference for the endospermous cotyledons of the fruits that they feed.

1. *Time* : The feeding is in the day time and it goes on roosting intermittently.

2. Trees and parts that are eaten by Grizzled giant squirrels :

Tamarindus indica	..	Pods.
Ziziphus jujuba	..	fruits.
Psidium gunajava	..	fruits.
Terminalia bellerica	..	fruits.
Albizzia amara	..	Tender leaves very rarely.

Albizzia odorotissima		**Pods** .
Emblica officinalis	..	fruits.
Mangifera indica	..	fruits.
Sizizium cumunii	..	fruits.
Derris indica	..	fruits.

10.3.3. *Nesting behaviour.*—

(i) *Nesting observed in the following trees* :—

Albizzia amara	..	Usil.
Terminalia arjuna	..	Neermarudu.
Tamarindus indica	..	Puli.
Terminalia bellerica	..	Thani.
Albizzia odorotissima.		Vagai.
Mangifera indica	..	Mango.
Derris indica	..	Pungai.
Syzizum Cuminii	..	Naval.

Nests are found mostly about 15 m in height in the branches. They are known to make two kinds of nests in a year one for breeding and another for normal life.

10.3.4. *Breeding behaviour* — Grizzled giant squirrels are reported to be breeding twice in a year. In captive breeding other species of giant squirrels like Ratufa indica and Malayan giant squirrel are breeding throughout the year in the Vandalur Zoological park and Dr. Paulrai, Ph.D., A.I.F.C., has done considerable work on captive breeding. Mr. Justus Joshua, a research scholar is doing research on this squirrels and the research works have been sponsored by the Government of India. He has done considerable work on breeding behaviour in the natural environment. However a lot of study has to be made to understand the breeding behaviour.

10.3.5. *Territorial behaviour* .—The Grizzled giant squirrel exhibit district territorial behaviour. The Author has observed fighting between two male giant squirrel when one of them entered into the territory of the other. These squirrels jealously guard their territory which varies from 100 m. to 200m. radious. Thiru John Joseph, Chief Conservator of Forests has mentioned about the migratory behaviour this giant squirrel in the minutes of the approved Reconnaissance Report of the composite Ramanathapuram Division. In view of the fully confirmed report on the territorial behaviour of these grizzled giant squirrel there are no chances of migration of these squirrels. It appears that the territory marking is done by these squirrel with the analscent substances.

10.3.6. *Ecological niche* —The grizzled giant squirrel is confined only to the Alagarkoil Valley. The other species of giant squirrel like India giant squirrel and Malabar giant squirrel is not found in this Alagarkoil Valley. It is not very clear as to whether these species can co-exist in the same habitat. The length of the grizzled giant squirrel habitat is about 2 K.m. and the average width is about 100 metres. The total niche of the grizzled squirrel (i.e., its food niche its spatial niche and its time niche) appears to be exactly the same as that of Giant Indian squirrel (Ratufa indica) which is perhaps the reason why these species do not co-exist. Predominant trees in this habitat is Terminalia arjuna with very few trees of naval and mango whereas the Giant Indian squirrel habitats generally have predominance of naval trees along with Mango and Terminalia Arjuna. It appears that the Alagarkoil valley habitat has not been coeconized by Giant Indian squirrel because of the comparatively lesser availability of fruits.

10.3.7. *Methods to be adopted for habitat improvement*— The objective here is to preserve the existing habitat and the arboreal 'pathway and to extend the habitat and the arboreal pathway on eitherside of the stream margin. Hence the following methods are prescribed :

10.3.8. *Cleaning* .—Not even a single blade of grass has to be removed. Complete preservation of the vegetations prescribed.

10.3.9. *Protection* .—Special staff may be employed to give full proof protection to the existing trees.

10.3.10. *M.F.P. Collection* .—Collection of all kinds of Tree based MFP times found in the entire Alagarkoil Valley has to be stopped. The collection of usufructs results in dismantling of the nests of these squirrels, and also leads to depletion of the available food materials.

10.3.11. *Planting* .—Planting of selected tree species mainly of fruit trees which are commonly eaten by these squirrel is prescribed.

10.3.12. *Choice of species* : The choice of species prescribed are furnished in the following paragraphs. The criterion for choise of species are :

1. Very tall growing.
2. Fruits which are eaten by these giant squirrels.
3. Native trees of this locality.
4. Familiarity of these squirrels with the proposed species.
5. Wind-firm.
6. Long life.
7. Less use for human beings in order to discourage the human interference.

The following list gives the choice of species prescribed for planting.

1. Syzizium cuminii	..	..	40 per cent.
2. Ziziphus mauritiana		..	20 per cent.
3. Spondius pinnata	..	..	10 per cent.

4. Terminalia arjuna .. .. 10 per cent.

5. Terminalia oellerica .. 10 per cent.

The following species are deliberately left out because of the nuisance value they are having on the life of the squirrels.

Tamarindus indica.

Mangifera indica.

Derris indica.

and other important (valuable) MFP trees are to be excluded.

10.3.13. *Pitting size*.—1 m. X 1 m. X 1 m. Spot cleaning of bushes may be done in a radius of about 1.5 m. area in the planting spot.

10.3.14. *Espacement*.—Approximately 10 m.X 10 m. depending upon the gaps. The espacement can be varied depending upon the existing gaps in the forests. If still wider espacement of 15m. X15 m. or even 20m. X 20m. are considered adequate the same be adopted.

10.3.15. *Area of planting*.—A linear strip of about 100 metres on either side of the river jargin is taken. The 100 m. width commence from the margin of the existing tree line along the river margin the width of the planting can be widened depending upon the site in the following areas:—

Rajapalayam Range.

1. Arjuna-nadhi	Main streams.
2. Periar	
3. Mudangiar	
4. Vaiper	Small rivulet.
5. Upper Odai	
6. Piravadaiyar	
7. Nagaraiar	

Srivilliputhur Range.

1. Athithiondar	(Alagarkoil Valley)
2. Periyar	Main streams.
3. Kallar	
4. Mana odai	Small rivulet
5. Palar	
6. Chithar	

10.3.16. *Watering*.—Watering the planted saplings for the initial two years in the non-rainy months is prescribed.

10.3.17. *Fencing*.—Thorn fencing may be provided to individual saplings planted. Tying of thorns all around the stem of the saplings and it's periodical renewal is prescribed.

10.3.18. *Annual target*.—Annually about 20,000 plants may be planted. However the number may vary depending upon the site conditions.

Regulation of MFP Collection in Shenbagathope Area.

10.3.19. The Shenbagathope area of the Srivilliputhur temple Devasthanam harbours a good number of grizzled squirrels. As these areas are leased annually for the private contractors for the collection of MFP items like tamarind and mango, lot of damage is caused to the nests of these squirrels and the feeding materials of these squirrels are being 'stolen' by the human beings. These areas are to be brought under the control of the department. There are two alternatives: The Government may pay the annual lease amount to the temple authorities and may prevent the collection of any MFP items in this area as the collection season coincides with the crucial breeding season of these squirrels. Alternatively these lands may be acquired by the Government in order to preserve this unique speicies of our land.

Nursery Techniques.

10.3.20. *Local of the nursery*.—Nursery has to be located anywhere along the river margin nearer to the proposed planting areas at the discretion of the District Forest Officer.

10.3.21. *Nursery techniques*.—Vandalur Zoo method of raising tall saplings is prescribed. The technique of raising gunny bag-wrapped balled saplings are described in the following paragraphs.

10.3.22. Raised mother beds of 19mX1mX0.30m are formed and seeds are sown in January. Fertile bed earth, sand and farm yard manure are transported, shifted and mixed in 2:2:1 ratio and filled in poly bags of 13 X 25 cm and seedlings from mother beds are pricked out in these poly bags in February. Side by side sunken beds of 10m X 1.5m X 0.50m are dug up. As the natural soil is either clayey or gravelly with disintegrated rock, this is removed and red earth, sand and farm yard manure is transported shifted and mixed at 2:2:1 ratio and the dug out sunken bed is filled with this mixture to a height of 40 cm. leaving 10 cm depth unfilled to facilitate flood watering. These filled up sunken beds are irrigated twice and levelled to make flooded water cover the entire bed.

10.3.23. In February/March either three months old seedlings from poly pots or one month naked seedlings from mother beds are planted in sunken bed at an espacement of 0.5 m X 0.5 m in euinqunx. Flood watering is done daily for one month. Later watering can be done on alternate days.

10.3.24. Weeding in the sunken bed is done regularly. The places eroded by flood watering is filled up with earth daily. Forking with in hand forks around plants and applying cow dung solution or neem cake powder is done once in a month. Taken proper care using insecticides whenever necessary, these plants grow to a height of more than 1.5m in six to eight months. 2 meter height saplings are obtained in ten months.

10.3.25. Now the plants are ready for removal with a ball of earth without disturbing the major root system. Watering is stopped three days prior to removal. Removal should not be made in rainy season. Digging with sharp and short crowbar is done along a cirlce marked to a diameter of 40 cm. around the plant in a systematic way without injuring the root system of the plants and the dug up earth is removed. Intervening side roots, if any found beyond this 40 cm diameter is cut with sharp scissors or good bill hook.

10.3.26. When this digging goes beyond 40 cm. depth the circle of digging is sloped inwards and when it goes near the tap root and if the tap root has one into the hard ground beyond this, the tap root is cut there with a sharp knife or a good bill hook.

10.3 27. This plant with the ball of earth intact is lifted carefully and kept in spread out gunny bags. Then the gunny bag is folded on all sides covering the ball of eath and stitched using twine. These plants are labelled with the date of removal and arranged in shade. In the Nursery, if shade tree are not available flat roofed shade with coconut leaves have to be provided. These gunny pack saplings are watered profusely three to four times a day depending on the climatic condition for fifteen days. By this time they get established in the gunny pack and they become fit for planting. Only Neem and rain tree takes three to four weeks to get established. Tamarind is a difficult species to pack up in this manner, since the species does not with stand root shock. It takes a longer time to eatablish and requires special attention at every stage. Hence Tamarind seedlings are planted to pots of 30 to 40 cm. height. These pots are burried in the sunken bed and the intervening spaces are filled with sand. Flood watering is done as usual. These potted seedlings are lifted at the time of planting. If the packed plants are not planted within a month of removal they are seasoned by reducing watering.

10.3.28. For planting these gunny bag seedlings, one metre cube pits filled with fertile earth, sand and farmyard manure is required while planting, after keeping the plant, in the pit. the gunny bag is removed. After planting one pot of water is poured. Prosops branches are tied around the main stem of the plant to avoid cattle menace. One or two metre height stock has to be planted as a support.

10.3.29. The following species have been successfully raised under this technique by the Author in Chengalpattu Division and in Krishnagiri Social Forestry Division.

1. Tebebea rosea	Tabebea
2. Acacia auriculiformis	Kathisavukku
3. Maduca longifolia	Iluppai
4. Azadirachta indica	Vembu
5, Deris indica	Pungan
6. Albizzia lebebekk	Vagai
7. Entrolobium saman	Raintree
8. Tectona grnadis	Teak
9. Casuarina equisetifolis	Savukku
10. Delonix regia	Gulmohar
11. Mellingtonia hortensis	Maramalli
12. Peltoforwm ferrugineum	Pelt
13. Delonx elata	Vedana ayan.

10.3.30. The main problem in adopting this technique is the chances of large scale casualty if their is disturbance to roots while transporting the saplings. Watering for a period of 3 months is absolutely essential during non-rainy days for successful of saplings. Saplings are to be raised preferably nearer to the planting spot to avoid rootstock during transportation.

SECTION IV

Malabar Squirrel

10.4.1. Malabar squirrel is found all along the stream margin in the Ayynarkoil area. The forests here are more mesophytic when compared to the forests along the Alagarkoil area. The trees mostly are Naval and mango along the streams. There were conflcting reports about the existence of grizzled squirrel in these Ayyanarkoil valley. However the Author could not see any grizzled squirrel in these area. The habitant of these malabar s squirrels may also be improved on the lines suggested for the grizzled squirrel in the preceeding section.

SECTION 5

Elephant Habitant improvement.

10.5.1. This part of the western ghats constitutes part of the elephants corridor. Elephants frequant various areas in this tract. During monsoon season they come down to the valleys and lower slopes. During November 1986 when herbs of elephants cane down to the lower slopes, one female elephant fell intoa elephant unsuccessfully After a long battle for survival the female elephant died as it could not come out of the ditch.In another incident, one elphant killed a man who was reportedly teasing that particulars elephant for a few days before meeting his fatal end.

The elephant habitat presently is highly degraded and there is competition for the available forage from the local cattle.

Broadcast sowing of seeds of selected species of pala table species like Bamboo,and othergrassesare recommended This can be done either manually or more easily by aerial seeding. Pelleted seeds of Bamboo and grasses can be broadcast by serial seeding method. This aerial seeding can be done during rainy season. A detailed Project Report on Aerial seeding prepared by Thiru R. Gunasekaran, Forest Economist is appended *vide* AppendixXXIII.

SECTION 6.

Nilgiri Tahr Habitat improvement

10.6.1. Nilgiri tahr is mainly confined to the Mudaliar Uthu region, Pemalaimottai, Panchanthangi mottai and this species has got a special preference for the rocky cliffs. They feed mainly on the grasses and other locally available herbs.

10.6.2. Stopping of penning of cattle in the habitat of the Nilgiris Tahr and effective fire control are considered adequate measures for the habitat improvement. There is a vast scope for the research studies regarding the bohavaioral aspects and ecological niche.

For all the other species of fauna, prevention of disturbance to the present forest areas is considered adequate.

CHAPTER 11

Watershed Management working Circle

SECTION I

General constitution of working circle and character of vegetation.

A. Goals

11.1.1. To protect the forest catchment of all the riverian tract in this tract by treating the demarcated areas in accordance with the principles of integrated watershed management and to construct 10 water storage percolation ponds in the interfase corridor region of the forest eco-system and the Agricultural eco-system.

B. Objectives

11.1.2. (i) Minimising the risk and uncertainly involved in dry land agriculture by creating water security for improving the productivity of agricultural crops and conserving the basic resources of soil and water in selected watersheds.

(ii) Augmenting the water resources for drinking water purposes for the cattle and human population both by surface storage and by ground water re-charge.

C. Strategies

11.1.3. (i) Erecting a biological defence systemover the degraded forest land surface to regulate the water flow in the water shed for conservation of water and soil.

(ii) Storing the inevitable run-off in suitable structes to improve the ground water recharge and utilising through wells for providing life-saving irrigation to crops.

(iii) Reducing peak flows for flood control by slowing down the run off through afforestation and by impounding e water at multi-points in the watershed.

(iv) Reducing optimum amount of water in soil profile to increase the opportunity time and utilizing it efficiently.

D. Character of Vegetation

11.1.4. The forest areas allotted to this working circle are mostly Tropical deciduous forests and dry teakbearing areas. The vegetation in these areas have undergone a lot of degradation and hence needs urgent attention. Hence the areas included are mostly the degraded stages of the Tropical dry deciduous forests.

E. Watershed Terminology Explained.

11.1.5. This term 'watershed' is the American equit valent of catchman. The term 'watershed' is used in several senses. Some 30 years ago that word was taken to mean primarily the drainage area of the waters flowing into different rivers or streams. Gradually the term 'watershed' area' came into use mean the drainage basin ofa river on stream. In course of time theword 'area' wad sroppe and water shed came to mean the same as a drainage basi

11.1.6. The water shed presents an area through which precipitation is redistributed into components of the hydrologic cycle: In hydrologic terminology watersheds as refereed to as drainage basins or catchments. Each water shed possesses physical, chemical and biological properties that give it a unique set of hydrologic characteristics. It forms a convenient unit for the consideration of hydrologic responses and a system within which a balance can be determined between inflow and outflow of moisture energy and other parameters such as nutrients and pollutants. It also provides a convenient unit for forest management planning.

11.1.7. The topographic devides between two water sheds is relatively easy to locate in mountains regions, but is extremely difficult to dertermine in areas that are flat or have uniform relief. In addition the topographic divide does not always represent the water divide, which may be controlled by sub surface rather than surface future. The important point that precipitation, pollution disturbance or use occurring within the topographic divide of one water shed may affect the stream flow or ground water of an adjacent water shed.

11.1.8. Watershed is a hydrological unit which produce water as an end product by inter action of rainfall and water shed factors. The quantity and quality of water produced by a water shedis the index of amount and intensity of rainfall and the nature of water shed management. In some water sheds the aim may be to see that maximum quantity of water is distributed through out the area. In another watershed the primary object may b to reduce run off for minimising the flood hazards, in the lower valleys. In another system the concern may be for increasing the infilteration so as to improve the soil moisture regime for maximum production of crops and to minimise the surface run off.

11.1.9. Watershed has become an acceptabls unit of planning for optimum use and conservation of soil and water resources. Forest eco-system contributes water to surface streams and replenishes ground water storage. and regulates both surface flow and sub-surface flow. The demand for clean water that comes from forest land has increased greately and is bound to go up in future Hence managing the forest lands for harves ting the water acquires special significance.

F. Streams

11.1.10. *Stream system.*—Water intracts with the geologic structure and original form of the land to produce an organized stream system. This stream system is not static but continually down cuts channels. eroded banks and advances up valley slopes. Stream systems thus progresses from youth characterized by land forms with steep gradients and erratic channels to old age with gentle gradients and smooth sinous stream courses.

11.1.11. *Stream classification.*—The net work of stream system is classified by (1) duration of stream flow (2) veination and (3) stream order. Streams that carry water throughout the year are called *perennial.* Streams that carry water during only part of the year are called *intermeittnt.* Streams bearing water only during and mediatleme after rain are ald *ephemeral*

11.1.12. *Veination.*—Geologic structure and strata greatly determine drainage patterns. Relatively flat surfaces with geologi formations that are uniformly resistant to erosion develop a dendritic drainage pattern. In areas with jointed or faulted strata, streams tend to follow faults or joints least resistant to erosion, giving rise to a rectangular drainage pattern. In graciated areas and where outcropsparallel strata with unequal resistance to erosion occur stream channels develop a trellis pattern. The various patterns develop because streams always seek out and take advantage of weakness in the rock strata over which they flow. Streams patterns can provide foresters with useful clues about land stability, and in turn where certain practices should or should not be applied.

11.1.13. *Stream order.*—Stream ordering compares streams within the watersheds. Small streams at the uppermost level of stream system of watershed are labelled *First order* Two first order streams joint to form a *second order* stream, two second order steams join to form a *third order* stream and so on. Stream order can be used when writing guidelines or management or working plans. for example it might be desirable to make initial decisions about water control structures based on stream order.

G. Importance of Water Conservation for Proper land use.

11.1.14. Land is in-elastic in supply with reference to ever increasing and based demands. The land resources continue to be derided and degraded due to non-optimal use. The land and water are the important natural resources which are absolutely essential for all kinds of biological production systems.

11.1.15. Land should be put to use in accordance with its capability for maximisig the production by minimising deterioration. The land has to be progressively upgraded and its capacity for sustained production has to be maintained. At the National level, the first detailed examination towards land degradiation, over exploitation and injudicious use of land resources was made by the National commission on Agriculture. In its report, it had specifically highlighted the urgency of having a rational land use policy. The primary concern of the land use policy should be to continuously increase the productive capacity of land and to prevent its deterioration. The soil being the most important medium of plant growth, its management and imporvement must premeate the policy of land use, soil conservation being looked at as an integral part of programme for maximising land use.

11.1.16. Misuse, disuse, and abuse of land anywhere is a threat to productivity everywhere. The failure to manage these degraded lands often results in removal of soil and water from the place where they are needed and transported to places where they are not needed. Hence it is imperative to conserve soil and water, the most precious assets around which the human existence revolves.

11.1.17. Degradation, deforestation and erosion are contagious diseases of land and it spreads from one block or type of land to other type of lands very fast, because earth is basically continuity.

11.1.18. Wasteland upgradation is basically a land use strategy and has to be treated on the pattern of integrated watershed management in order to treat all the symptoms of the land degradation.

11.1.19. A critical input to all primary production systems as well as to all aspects of social environment is 'water'. Its availability in right quantity and at right time depends upon the ability of the soil profile to function as a storage structure as well as medium to replenish the channel flow and the ground water storage. The level of moisture maintained in the soil drainage at different periods of the year would regulate larger absorption of rainfall and favourable distribution of the same through out the profile, consequently for better plant growth as well as longer and steady replenishment of channel flows. Disruption of the inter relationship between the management of the lands surface and the moisture status, in the soil profile is visualised by more recurring and widespread droughts and floods.

11.1.20. Water is an essential input for crop production According to National Commission on Agricultural half of the available lands in India will continue to depend on monsoons even after our total surface and ground water potentials are fully exploited by 2025 A.D. So far efforts were made in improving the irrigation potential to step up crop production and very little attention has been given to dry lands in this regard consequently the economic condition of farmers in irrigated areas has considerely improved but the farmers' in dry lands areas are still exposed, to various forms of human suffering like recurring drought, floods, soil erosion in-stability in production, etc. This resulted in wide desparity between irrigated and dry land farmers.

11.1.21. Agriculture in India is still a "Gamble" in monsoons Risk and uncertainty are characteristic featured of dry land agriculture. Water is the major limiting factor in rainfed areas. Rainfall is the only source of water in rainfed areas.

11.1.22. There is necessity to improve the water storage position of the tanks and wells by increasing the ability of water shed to hold back rainwater by forming the percolation ponds, thereby augmenting the water resources, which will transform the rural traditional agriculture to modern agriculture including adoption of intensive agriculture,

11.1.23. Scientific development and management of watersheds ensures judicious use of land and water and helps to maximise crop production.

11.1.24. Watershed management in the limited sense aims at comprehensive development of the whole of watershed in accordance with its potentialities and capabilities for different land uses.

11.1.25. Development and conservation are two facts of the watershed management programme. While development aims at the use of Natural resources for human welfare, conservation aims to ensure such use on continuing basis. Conservation does not mean mere preservation but judicious utilisation of resources.

11.1.26. It is a programme of conservation of Natural resources to benefit the present generation while maintaining the potential to meet the needs of the furure generation also. Development and conservation are complementary to each other and cannot be isolated. To put it another way, economic security and ecological security should go together and this is the main concept in watershed management programme.

11.1.27. Land resources of rainfed regions have been subjected to increasing pressure of growing human and livestock population and the over exploitation has set in motion the process of accelerated degradition. Consequently the productivity of the soil has gone very low and there is a general deficiency of nitrogen and phosphorus Land development through an appropriate blend of mechanical vegetative and cultural conservation of moisture is, therefore a prerequisite for increasing and sustaining productivity in rainfed regions.

11.1.28. The traditional cultivation systems with long duration varieties of low genetic production potential acts as constraint in increasing crop production. New farming system which can respond well for achieving optimum production has to be designated and developed. The strategy consists of—

(i) To conserve the basic resources namely soil and water.

(ii) To make the best use of conserved resources for crop production by restructuring the cropping pattern, use of high yielding varieties, adoption of improved agronomic practices, improved farming systems and use of improved implements, etc.

(iii) and Evolve contingency plan to meet seasonal berrations.

11.1.29 The strategy envisages improved crop production technology super imposed on improved land resources supplemented by life saving irrigation and this will go a long way in stepping up and stabilising production in rainfed areas. Water is an essential input for crop production and rainfall is the only source of water in rainfed areas. Scientific management of rainwater therefore constitutes the core and Nucleus of the project.

11.1.30. Water is the major limiting factor in dry land, and aim of the watershed plan is to generate such activities which could conserve as much of the precipitation as possible either in the soil profile or through run off collection and storage. For promoting optimum land use and water, different vegetative cover according to land capability has to be promoted.

11.1.31. This is proposed to be achieved through watershed planning to facilitate optimum use of land and water Conservation and development of resources are the means to achieve this result. The measures suggested are :

(i) Retaining optimum amount of water in soil profiled increase the 'opportune time' and utilizing it efficiently.

(ii) Storing the inevcitable runoff in suitable storage structure to provide crops with life saving irrigation.

(iii) Recharge groundwater and utilise them through the wells and ponds.

(iv) Reduce peak flows and sediments for flood control.

11.1.32. Human and cattle population are constantly increasing and their land based needs are also bound to increase. Land is *inelastic* in supply with reference to ever increasing demand for land based produce. Land can be improved by various inputs enhance the productivity capacity of the land. Some of the inputs which have proved to be a substitute for land in improving production are the high yieling seeds, appropriate land management measures, water life saving irrigation, research and research findings, labour to some extent, pest control measures, etc.

11.1.33. *Water.*—Availability of moisture alone can increase the gross cropped area in a dry land tract by two to three fold by facilitating multiple cropping and intensification of agricultural production. Hence any effort made in harvesting water and augmenting water resources position in a dry farming tract will have a multiplier effect on all the primary production systems and it will also improve the socio economic profile of a region.

11.1.34. Water harvesting can be done by effectively protecting the slopes, by preventing the sediment contribution by the slopes and by facilitating the ground water recharge via vegetational root pipes. Land management measures like contour bunding, contour trenching, gully plugging, digging or trap-pits, per-colation ponds, etc. will also augment water resources in a region. There must a proper blending or mechanical measures and biological measures to achieve better results.

11.1.35. Augmenting the water resources position calls for three pronged strategy.

(i) Prevent the sediment yield to the existing water storage structures ponds, lakes, dams and arrest the reduction in the capacity of the existing storage structures.

(ii) Check the sediment flow into the irrigation channels and the riverian tracts by threatening the catchments in an appropriate manner.

(iii) Impound the rainwater in suitable places by erecting earthernfunds to facilitate ground water recharge by increasing the 'opportune time' for infiltration and subsequent percolation thereby preventing the inevitable water loss through run of.

SECTION 2.

DIVISION OF AREA

11.2.1. The total area allotted to this working circle are about 3000, ha. This is mostly overlapping working circle. These areas are mostly tropical deciduous forests and dry Teak bearing areas of this division. The areas are having a direct impact on the water supply systems of the Rajapalayam and Srivilliputhur owns in this tract

and these areas have to be dealt in accordance with water shed management principles. Details of microwater shed are marked in the map and the treatment for each micro-watershed is left to the District Forest Officer.

The areas marked for forming percolation ponds are lying in the interface corridor region of the forest eco-system and dry land agricultural system. The area included are—

1. Srivilliputhur R.F. 2000 ha.
2. Rajapalayam Range 600 1000 ha. (Sattur R.L. & Srivilliputhur RF400)

The yearwise target is furnished.

(*area in ha.*)

Name of the Range.	1987	88	89	90	91	92	93	94	95	96
Srivilliputhur Range.										
Srivilliputhur SR.F.	200	200	200	200	200	200	200	200	200	200
2. *Rajapalayam Range.*										
Srivilliputhur R.F.	40	40	40	40	40	40	40	40	40	40
Sattur R.L.	60	60	60	60	60	60	60	60	60	60
	100	100	100	100	100	100	100	100	100	100

SCTION 3.

METHODS TO BE ADOPTED

11.3.1. The proposed tract is cyclone prone area and cyclone is a recurring phenomenon in this tract. North east monsoon period of October-November-December is always characterised by cyclonic rainfall. Vast quantity of rain water is received in a very short period and hence flood is also a recurring phenomenon. As it happened in 1985 November cyclone, the breach of Maduranthagam tank in chingleput district has caused in calculable damage and loss to lives and property. Extensive damage was caused to the National Highways, Railway bridge and to the Agricultural crops in the command area of this tank.

11.3.2. Equally important is the problem of recurring drought in this tract. The solution for ameliorating the effects of the drought and flood lies in watersheds planning and the impact of flood and drought can be minimised by proper planning of the various land uses on a water

shed basis. Experience shows that well wooded land regulates the water flow by controlling the run off an by increasing the time of water flow in channels; it prevents flash floods by slowing down the quantum of water flow immediately after rains and by increasing the duration of water slow in the channels.

11.3.3. The trees acts as the first line of defence protecting the land from the battering rain by splitting the rain drops into harmless minute units thereby protecting the land from the direct impact of the raindrops. trees hold the rain water in leaves and trunk some time and regulates the flow by slowing down the flow of water. The roots of the trees also act as 'pipes' in ground water recharge.

11.3.4. The humus acts as a 'sponge' and prevnts the run-off (the inevitable water-loss) and makes it available through ground water recharge. Thus the biological components in a watershed system plays a very important role in regulating water flow and in preventing floods.

11.3.5. The engineering measures like cheekdams, percolation ponds, sediment, trap pits etc., will 'hold the water in appropriate places and will 'force' the water to infilterate and percolate for recharging the ground water. These minimise the run off and evoporation loss and improves the effectiveness of moisture availability in a region. It may be remembered that nearly one third of the rainfall is lost through evoporation under normal circumstances and this loss can be minimised by augmenting ground water recharge and by preventing the unchecked run-off. Hence the engineering measuring like checkdams percolation ponds, sediment trap pits etc., will be constructed and they will be suitably protected by the biological measures of tree planting.

11.3.6. In the interface corridor region; in the foot-hills planting linear rows with Agave veraeruz is prescribed This may be done in the areas not allotted for energy wood and silvipasture plantations. However in the boundry in the foot hills planting of four rows of Agave veracruz is prescribed.

SECTION 4.

CONTROL

11.4.1—A control Journal a control book, plantation and nursery journals, a record of works and control maps will be maintained for this working circle. This should be posted soon after the close of each financial year. The posting and maintenance of control records and maps is a matter of vital importance anc must receive the personal attention of the District Forest Officer.

11.4.2. *Control journal.*—The control will give a detailed account of the manage of the Range. The object of this journal is secure a running commentary on all objects of administration specially on the extent to which the object of the working Plan have been realised and the extent to wnich the object of the working plan working plan have been realised and the extent to which the method prescribed have been found suitable in the control book and the records of works. The journal is

intended to be given the District Forest Officer an opportunity for recording suggestions for modifications and improvements in the methods of working laid down in the Working Plan. The journal should therefore be taken into camp by the District Forest Officer and critical observations should be recorded in it during or after inspection. The control journal is a technical record and must be personally maintained by the District Forest Officer. A copy of the entries made during the year should be submitted to the Conservator of Forests soon after close of each financial year along with copy of the deviation statement, the control forms and maps. All the works carried out under the prescription of the working plan as well as such measures as are neither prescribed out should be recorded in this form 'Record of works'.

11.4.3. *Plantation journal.*— A plantation journal will be maintained which should contain the name and year of the plantation its location area,the nature of the previous growth, the revenue obtained by clearing growth the details and cost of formation of the plantation and further history like thinking and revenue realised thereby.

11.4.4. *Nursery journal.*— A nursery journal will be maintained for each year nursery showing is location and number, size of beds speices sown origin, date of sowing, nursery technique adopted, watering regime cost of maintenance, etc.

Both the nursery journal and plantation journal will be maintained personally by the Range Officer. Inspecting officers will note their remarks on these journals wheih will be replied to by the Range Officer. Copies of the journal will be maintained at the District Forest Officer also.

11.4.5. *Control Maps.*—Control maps should show all operations actually carried out in connection with the exploitation in each series as per prescriptions of the working plan as well as such measures as are neither prescribed nor suggested but are carried out.

So the control maps should be a convenient scale of the areas annually, regenerated with name of the species planted and with the dates of the original planting and they should kept as bound register at District Forest Officer's Office. Sample control forms to be posted by the end of each financial year for this working circle are appended.

CHAPTER 12.

Energy wood working circle
(Head loaders welfare working circle)

Section 1.—General Constitution of the working cirlce and character of vegetation.

A. Goals —

12.1.1. To raise about 2000 ha. of fast growing energy-wood plantations mainly in the degraded scrub areas in the foot hills of the western ghats and in other isolated scrub forests in order to meet the cooking energy needs of the people.

B. Objectives —

12.1.2. Creation of energy wood resources in order to meet the energywood needs of the poor people, which will minimise the illicit fellings in the ecologically sensitive close canopied forest areas of this tract.

C. Strategies—

12.1.3. Allocating and demarcating about 2000 ha. of degraded scrub forest areas in the foot hills and raising fast growing energy plantations in the allotted areas and harvesting these energy wood plantations at a shorter rotation of 5 years, for distributing them mainly to the poor people, Habitual head-loaders will be identified and harvesting will be done through them. The only mode of transport that should be allowed to transport these energy wood is headload and no other method should be adopted. This step will ensure the flow of benefits to the poor people and will minimise the forest degradation.

D. Character of Vegetation—

12.1.4. The areas allocated to this working circle are mostly the degraded tropical dry deciduous forests in the form of sparse vegetation where the productivity is extremely low. All the areas allotted are in the foot hills. As these areas are not bearing any trees, people are going deep inside the forests for collecting firewood and this trend has to be halted.

SECTION 2.

A. Allotment of areas.

12.2.1. The total area allotted to this working circle are about 2000 ha. and this is a non-overlapping working circle. The area allotted to this working circle are :

1. Srivilliputhur R.F. 1200 ha.
2. Seithur R.L. 800 ha.

12.2.2. The Odai plantations raised in the Sappani Parambu and Valakulam Parambu are to be included under this energywood working circle. However, no felling of Odai Plantations is prescribed in view of the environmental considerations.

12.2.3. In addition to this if raising of any plantations is contemplated in the Sappani Parambu, Valakulam Parambu and Kollangondon, only energywood plantations has to be raised in accordance with the techniques prescribed here.

The only species prescribed is prosopis juliflora in view of the fact that this region is a declared drought prone area. Details of villages and the modalities of distribution has to be worked out by the District Forest Officer. Area allotted to energy wood working circle has been duly marked in the map.

The yearwise target of this division is furnished.

B. *Schedule of Planting.*

(Area in ha.)

	Srivilliputhur Range.	*Rajapalayam Range.*
(1)	(2)	(3)
1987 ..	120	80
1988 ..	120	80
1989 ..	120	80
1990 ..	120	80
1991 ..	120	80
1992 ..	120	80
1993 ..	120	80
1994 ..	120	80
1995 ..	120	80
1996 ..	120	80
Total ..	1200	800

SECTION 3.

Method of Treatment.

12.3.1. *Surveying.*—The areas allotted to this working circle are marked in the map. Annual regeneration area has to be surveyed before commencing regeneration works.

12.3. 2. *Fencing.*—Planting of double rows of Agave veracruz all around the boundary of the annual regeneration area is prescribed.

12.3. 3. *Moisture and soil conservation works.*—Generally before raising plantations, all kinds of moisture and soil conservation works are to be carried out Various kinds of moisture conservation works that are

to be adopted may vary from site to site, specific. However the following works are to be carried out wherever necessary:—

(i) Contour bund

(ii) Gully plugging works,

(iii) Contour trenches etc.

All kinds of efforts should be made to with hold as much rain water as possible in the planting site.

12.3.4. *Clearing and uprootal.*—Complete clearing of the existing growth (including the existing plantations wherever prescription for replanting) and complete uprootal has to be done.

12.3.5. *Site preparation.*—After clearing, contour trenches at an interval of 2m X 2m are to be dug. The trenches shall be 'V' shoped, 0.6m long and 0.5m top width and 0.4m long and 0.5m top width and 0.4m bottom width. As far as possible, trenches shall be dug across the slope and along the contour lines. The spacing may vary at some places when contour trenching is done.

12.3.6. *Choise of species.*—The only species prescribed is Prospis juliflora and no other species should be planted.

12.3.7. *Espacement.*—As Prosopis juliflora is a multi-stemmed tree. Wider espacement of 2m X 2m is considered adequate. Normally for energy wood plantations espacement shall be 1m X 1m or 0.7 X 0.7m or 0.6m X 0.6m and the density normally aimed at is approximately about 20,000 ha. As proposopis is a multi-stemmed tree a density of about 20,000 ha. can be attained even with an espacement of 2m X 2m.

12.3.8. *Regeneration.*—Freshly collected seeds of propsopis juliflora are to be sown in the trenches which are dug along the contour at an espacement of 2m X 2m. 10 seeds may be sown per pit. The seeds are to be pre-treated adopting the method normally prescribed for majority of the leguminous seeds and particularly all the Acacias: usual hot water treatment is considered adequate. Seeds may be sown in the months of July, August, September on any rainy day, so that the North east monsoon can ensure the successful survival of these plantations. Planting of container seedlings is considered unnecessary. However planting of container seedlings may be resorted to whenever there is difficulty in raising plantation by seed sowing.

12.3.9. *Subsidiary silvicultural operations.*—No subsidiary silvicultural operations are prescribed. However, if the District Forest Officer feels, that soil working all around the trench is likely to benefit the seedling growth, weeding and soil working to a radius of 1m and to a depth of 15 c.m. may be done with causing any soil erosion.

12.3.10. *Rotation.*—Five year cutting cycle is prescribed.

12.3.11. *Silvicultural system.*—Simple coppice system has to be adopted.

12.3.12. *Regulation of felling.*—Felling has to regulated in such a way that the felling operation provide year round employment to the local habitual head loaders.

12.3.13. *Agency of felling.*—Only habitual head loaders are to be engaged and felling has to be supervised by departmental staff and removal shall be governed by head load permits. Anyother system of felling or engaging private contractors for felling may defeat the very purpose of the constitution of this working circle. This working circle mainly aims to rehabilitate the habitual head loaders which will indirectly help to conserve the trees in deep inside the forests. Under no circumstances, transport of these produce be allowed to be carried by trucks, or lorries and even cycles and cartloads are to be completely discouraged.

SECTION 4.

Control.

12.4.1. *Control.*—A control journal, a control book plantation and nursery journals, a record of works and control maps will be maintained for this working circle. This should be posted soon after the close of each financial year. The posting and maintenance of control records and maps is a matter of vital importance and must receive the personal attention of the District Forest Officer.

12.4.2. *Control journal.*—The control journal will give a detailed account of the management of the Range. The object of this journal is secure a running commentary on all objects of administration specially on the extent to which the object of the working Plan have been realised and the extent to which the method prescribed have been found suitable in the control book and the records of works. The journal is intended to be given the District Fotrest Officer an opportunity for recording suggestions for modifications and improvements in the methods of working laid down in the working Plan. The journal should therefore be taken into camp by the District Forest Officer and critical observations should be recorded in it during or after inspection. The control journal is a technical record and ***must be personally maintained*** by the District Forest Officer. A copy of the entries made during the year should be submitted to the Conservator of Forests, soon after close of each financial year along with copy of the deviation statement, the control forms and maps. All the works carried out under the prescription of the working plan as well as such measures as are neither prescribed nor suggested but are carried out, should be recorded in this form "Record of works".

12.4.3. *Plantation journal.*—A plantation journal will be maintained which should contain the name and year of the plantation, its location area, the nature of the previous growth, the revenue obtained by checking growth the details and cost of formation of the plantation and further history like thinning and revenue realised thereby

12.4.4 *Nursery journal.*—A nursery journal will be maintained for each years nursery showing its location and number size of beds species sown origin, date of sowing. nursery technique adopted, watering regime, cost of maintenance etc.

Both the nursery journal and plantation journal will be maintained personally by the Range Officer. Inspecting officers will note their remarks on these journals which will be replied to by the Range Officer. Copies of the journal will be maintained at the District Forest Kfficers also.

12 4.5. *Control Maps*, Control Maps should show all operations actually carried out in connection with the exploitation in each series as per prescriptions of the working Plan as well as such measure as are neither prescribed nor suggested but are carried out.

So the control maps should be a convenient scale of the areas annually regenerated with name of the species planted and with the date of the original planting and they should kept as bound register at District Forest Officer's Office. Sample control forms to be posted by the end of each financial year for this working circle are appended.

CHAPTER 13.

Teak Plantation Working Circle.

Section : 1. General Constitution of the working circle and character of vegetation.

13.1.1. *General Remarks.*—This working circles included all the existing Teak plantations in the Kamarajar Division in addition to the natural teak bearing areas. The western ghats which falls in this tra once consisted of magnificant Teak trees in a larger area, both dry teak as well as moist teak once occurring in this tract. Due to human interference the teak trees gradually disappeared from the scene and presently there are very few teak trees in a very restricted area of this tract. Hence all the existing teak plantations and the natural teak forests are brought under this working circle.

13.1.2. *Objects of management.*—To protect the existing teak plantations as well as the natural teak for eventual exploitation.

13.1.3. *Character of Vegetation.*—The areas included under this working circle originally belonged to the dry teak forests and moist teak forests in sheltered valleys and river margins.

SECTION 2.

Division of area.

13.2.1. The existing teak plantations in Seithur R.L., over an area of 225 ha, come under teak working circle and these plantations have to be restocked in this Division. There is no fresh planting under this working circle. The list of yearwise statement of restocking plantations and the intensive soil and moist conservation measures prescribed, are furnished under this working circle.

The yearwise target is furnished as below :—

Serial number and year of restocking.		*Name o the plantations.*	*Area (in ha.)*
(1)		(2)	(3)
1. 1987	..	1956 Deviar	20.23
2. 1988	..	1957 Deviar	20.63
3. 1989	..	1958 Deviar	20.23
4. 1990	..	1959 Deviar	20.23
5. 1991	..	1960 Deviar	22.66
6. 1992	..	1961 Deviar	22.04
7. 1993	..	1956 | 1957 |	40.86
8. 1994	..	1958 Solaiseri	19.83
9. 1995	..	1959 Solaiseri	15.76
10. 1996	..	1960 Solaiseri	21.85
		Total ..	223.32 ha.

(Area furnished here is as per the Reconnaissance report for Ramanathapuram Division by Thiru Thirumoorthy.)

13.2.2. The plantations raised in the Ayyanarkoil area are furnished —

Serial number.	*Name of the plantation.*		*Area. (in ha.).*
(1)	(2)		(3)
1	1934	Ayyanarkoil	6.07
2	1935	Do.	6.27
3	1936	Do.	5.67
4	1938	Do.	12.14
5	1939	Do.	12.14
6	1940	Do.	8.42
7	1941	Do.	10.11
8	1942	Do.	12.14
9	1943	Do.	10.11

13.2.3. These plantations are not traceable and whatever remains are scattered over large area. Hence they are not included in the teak plantation working circle. These areas have been merged with Ayyanarkoil feel series of the older working plans. All the vestigial remnants of these teak areas may be preserved as such.

13.2.4. Hence the total area allotted to the teak working circle is about 225 ha. This area do not included the natural teak bearing areas of various R.Fs. of Rajapalayam Range.

SECTION 3.

Analysis and valuation of the crop.

13.3.1. Teak planting was commenced in the Seithur ex-estate forests in the year 1956 under the orders of the then Chief Conservator of Forests in order to make up the state wide shortage of Teak which was anticipated in the wake of states Reorganisation which ultimately took place in the same year. An area of 40.46 ha. (100 acres) was planted up with the species during the same year at Deviar and Solaiseri. In 1957, the District Forest Officer, Thiru G. J. Rajasingh prepared a scheme which prescribed the continuance of planting of teak in two series at Deviar and Solaiseri at the rate of 20.23 ha (50 acres) annually.

13.3.2. The plantations raised have not been very successful the teak is crooked and branchy. The canopy is not uniform and the growth exhibited is rather slow. The soil in both the localities is quite

deep consisting of a cool clayey loam which appears suitable for teak but the rainfall received is as low as 800 millimeters per annum.

13.3.3. Practyicall very little rain is received from the south west monsoon, the locality being in the immediate rain shadow area of western ghats and hence the passing clouds rapidly dissipate towards east. The scanty south west monsoon left no choice but to resort to North east planting. The precipitation from the North east Monsoon is very ill distributed in that practically all of it is received from the middle of October to December. This short rainy season leaves the plants with too short a period to establish themselves fully with the result that casualities at the end of the short growing period are heavy and survivals struggle to exist, and by the end of the hot weather there are some more casualities.

13.3.4. Another distinct disadvantage in the area has been the more or less complete absence of felling refuse left over for a good burn, which is oniomatic in raising a good teak plantations, unlike as in the typical teak planting areas on the west coast.

13.3.5. Adding to these two disadvantages a number of plants are broken year after year by elephants in the periphery which seem to run loose in the Sirakadu forests during the south west monsoon period when upper hills receive rain, and again during the North-east monsoon when both the upper slopes and the lower forests receive precipitation.

13.3.6. Except for observing that the net result of the natural disadvantages enumerated above resulted in a rather ununiform and not fully stocked plantations and whether judicious tending of the natural teak in the area would not result in a better class of forest at less cost to Government and creating a teak improvement working circle to this end, Thiru Wilson did not prescribe any cultural work to be carried out in the above plantations. This is to great extent was a mistake because it created a wrong impression of abandonment of the plantations in the minds of the staff who consequently neglected the plantations and even allowed illicit fellings in them.

13.3.7. Further planting of Teak in the division was stopped after 1961.

SECTION 4.

13.4.1. *Method of Treatment* .—Moisture and soil conservation works like contour bunding, contour trenching, gully plugging etc., may be carried out, in order to boost the growth of the Teak trees.

13.4.2. Rotation 40 years is prescribed as per the rotation fixed in the neighbouring Tirunelveli working Plan. However if there is danger of these trees being illicitely removed, this rotation age may be reconsidered and the district Forest Officer may take suitable measures for fellings and for preventing any loss.

The following facts have to be taken into consideration in fixing the trotation.

(i) Rotation is fixed at the age which produces the maximum timber of medium size provided the quality of the localitiy would permit. In practice it is essential that while financial aspects must be considered. Other demands of the community dependent on the forest are also met. Length of rotation has direct effect on the condition of the soil and on the capacity of the stand for natural regeneration.

(ii) A study of the quality class of existing plantations show that these locality can produce only the IV quality or a low IIIrd quality teak.

(iii) There is considerable variation in girth and height of the trees of different plantations of the same locality as well as within one and the same plantation.

(iv) The girth increment of these plantations is good for the qualtiy inspite of the thinning beinlight and irregular.

(v) Lot of high quality teak timber is coming from the adjoining Kerala forest.

(vi) In any plantations of age 30 to 40 years a fair percentage of trees have attained 90cm girth at breast height.

So in view of the above consideration the rotation is fixed at 40 years.

13.4.3. *Felling cycle*. —As the plantation have not reached the rotation age, no felling cycle is prescribed.

13.4.4. *Agency of extraction.*— henever felling is contemplated the extradiction should be done departmentally.

13.4.5. *Silvicultural system*. —Selection system has to be adopted.

13.4.6. *Regeneration* : No fresh planting is prescribed However best staff may be instructed to collect good quality teak seeds and may be sown by broad cast method in the natural teak bearing areas.

13.4.7. *Control* : The control forms which accompany this plan should be posted soon after the clost of each financial year. A control journal, a control book, plantations and nursery journal, a record of works and control maps will be maitained for this working cirlce. The posting and maintenance of control records and Maps is a matter of vital importans and must receive the personal attention of the District Forest Officer.

13.4.8. *Record of works* : All works carried out under the prescription of the working plan as well as such measures as are neither prescribed nor suggest but are carried out should be recorded in the forms.

13.4.9. *Objects*.—The control maps should be a convenient scale of the areas annually regenerated wth the name of the species planted and with the dates of the original planting.

The control journal will give a detailed account of the management of the range. The object of the journal is to secure a running commentary on all objects of administration specially on the extent to which the object of the Working Plan have been raised and the extent to which the methods prescribed have been found suitable in the control book and the record of works. The journal is intended to be given the District Forest Officer an opportunity for recording suggestions for modiciation and improvements in the method of working laid down in the working plan. The journal should therefore be taken into camp by the District Forest Officer and critical observation should be recorded in it during or after inspection.

13.4.10. *The control journal.*—Is a technical record must be maintained personally by the District Forest Officer. A copy of the entry made during the year should be submitted to the Conservator of Forests soon after the close of each financial year along with a copy of the deviation statement, the control forms and Maps.

13.4.11. *Plantation journal.*—A plantation journal will be maintained which would contain the name and year of the plantation, its location areas, the nature of the previous growth, the revenue obtained by clearing the growth, the details and cost of formation of the plantation and further history like thinning and the revenue realised thereby.

13.4.12. *Nursery journal*.—A nursery journal will be maintained for each years nursery showing its location and number, a size of beds species sown origin, date of sowing, nursery technique adopted watering regime, cost of maintenance etc., Both the plantation and nursery journals will be maintained personally by the Range Officer. Inspecting officer will note the remarks on these journals which will be replied by the Range Officer copies of these journals will be maintained at the Officer. District Forest Officer also Sample forms for the control records and control journals for all the working circles are given in appendices.

CHAPTER 14.

MATCHWOOD PLANTATION WORKING CIRCLE

Section : 1 Constitution of working circle and character of vegetation.

14.1.1 *General remarks* .— This working circle includes all the existing Ailanthus Excels a plantations in Kamarajar Division.

14.1.2. Objects of management :—The object is to meet the demand for matchwood by the Matchwood industries which are located in this division to the extent possible.

14.1.3. *Character of vegetation* :—The area included mostly belonged to the forest type 5A/C3 southern dry mixed deciduous forests which were re-forested with Ailanthus excelsa.

SECTION 2.

Division of area.

14.2.1. An area of about 420 ha., of plantations raised in Siethur R.L. are included under the match wood working circle A list of plantations included are furnished below .—

Serial number.	*Name of the plantation.*	*Area in ha.*	*Survival percentage.*
(1)	(2)	(3)	(4)
1	1958 Pravadiar	17.87	46
2	1959 Do.	17.80	46
3	1960 Do.	32.37	60
4	1961 Do.	30.75	62
5	1962 Do.	30.35	58
6	1963 Do.	45.32	60
7	1962 Navaloothu	19.42	69
8	1963 Do.	21-04	61
9	1964 Do.	40.35	63
10	1965 Do.	30.35	68
11	1966 Do. Bit I.	30.56	60
12	1967 Do.	32.78	61
13	1968 Navalooth Bit I.	30.76	60
14	1969 Do.	30.60	40
15	1970 Deviar	20.24	62
	Total ..	420.56	

(Area furnished here is as per the Reconnaissance report for Ramanathapuram Division by Thiru Thirumoorthy).

SECTION 3.

Analysis and valuation of crop.

14.3.1. In order to meet the needs of several match factories in the district for matchwood, planting of Ailanthus excelsa was taken up in these forest) 1958 and continued right upto 1969. The plantations from · 1960 onwards were raised under the prescriptions of a separate working circle known as the Matchwood plantation working circle constituted by Thiru Wilson. The total area of the plantations raised as 420.56 hectares.

14.3.2. Although stocking in the plantations is satisfactory overall growth is generally unsatisfactory except along stream banks and along the peripery of the plantations, Hence, further planting was stopped.

14.3.3. In 1966, Ailanthus excelsa plantation (Bit II) 61 trees were illicitely felled on 18th April 1984. On 27th September 1984, it was found that coppice shoots varying from 4 to 36 had come up and the shoots measured varied between 48cm to 80 cm in height (Thiru Thirumoorthy., Reconnaissance report for Ramanathapuram Division).

SECTION 4.

Method of treatment.

14.4.1. *Moisture and soil conservation works* :—In all the existing plantations moisture and soil conservation works like contour bunding, contour trenching and gully plugging works may be carried out in order to improve the moisture regims which will boost the growth of the stagnating trees.

14.4.2. *Silvice cultural system.*—Selection system.

14.4.3. *Rotation.*—A rotation of 30 years is prescrobed, but only those which are above 60 cms. girth are to be selectively extracted.

14.4.4. A rotation of 30 years is prescribed, but only those which are above 60cms girth are to be selectively extracted.

14.4.5. *Agency of extraction* :—Only departmental extraction is prescribed.

14.4.6. Control .—Control forms relating to this working circle are appended and should be posted at the end of each financial year.

14.4.7. Control :—A control journal a control book, plantation and nursery journals, a record of works and control maps will be maintained for this working circle. This should be posted soon after the close of each financial year. The posting and maintenance of control records and maps is a matter of vital importance and must receive the personal attention of the District Forest Officer.

14.4.8. *Control journal*.—The control journal will give a detailed account of the management of the Range. The object of this journal is secure a running commentary on all objects of administration specially on the extent to which the object of the working plan have been realised and the extent to which the method prescribed have been found suitable in the control book and records of works. The journal is intended to be given the District Forest Officer an opportunity for recording suggestions for modifications and improvements in the methods of working laid down in the working plan. The journal should therefore be taken into camp by the District Forest Officer and critical observations should be recorded in it during or after inspection. The control journal is a technical record and must be personally maintained by the District Forest Officer. A copy of the entries made during the year should be submitted to the Conservator of Forests soon after close of each financial year along with copy of the deviation statement, the control forms and Maps. All the works carried out under the prescription of the working Plan as well as such measures as are neither prescribed nor suggested but are carried out, should be recorded in this form "record of works".

14.4.9. *Plantation journal*:—A plantation journal will be maintained which should contain the name and year of the plantation its location area, the nature of the previous growth, the reve nue obtained by clearing growth the details and cost of formation of the plantation and further history like thinning and revenue realised thereby.

14.4.10. *Nursery journal*:—A nursery journal will be maintained for each years nursery showing its location and number, size of beds species sown origin, date of sowing, nursery technique adopted, watering regime, cost of maintenance, etc.

Both the nursery journal and plantation journal will be maintained personally by the Range Officer. Inspecting officers will note their remarks on these journals which will be replied to by the Range Officer Copies of the journal will be maintained at the District Forest Office also.

14.4.11. *Control Maps*.—Control maps should show all operations actually carried out in connection with the exploitation in each series as per prescriptions of the Working Plan as well as such measures as are either prescribed nor suggested but are carried out.

So the control maps should be a convenient scale of the areas annually regenarated with name of the species planted and with the dates of the original planting and they should Kept as bound register at District Forest Officer's Office. Sample control forms to be posted by the end of each financial year for this working circle are appended.

CHAPTER—15.

SILVIPASTURE WORKING CIRCLE.

Section 1—General Constrituction of working Circle and Character of vegetation.

A. Goals.

15.1.1. One of the fundamental duties of the forest department is to cater to the needs of the cattle by development the forest lands on silvipastoral lines. Adequate areas has to be allocated, developed and managed to augment the fodder resources of this tract. In order to improve the cattle resources of this tract. Hence it is proposed to develop about 900 hectares of degraded forest lands in 10 years is silvipasture plantations in order to meet the needs of the cattle of this tract.

B. Objectives.

15.1.2. To augment the fodder resources of this tract by raising pasture/silvipasture plantations for distributing fodder and fodder seed materials to the rural poor people and to the cattle co-operative societies.

C. Strategies.

15.1.3. The strategies include identifying and demarcating the allotted blocks of forest lands for raising silvipasture plantations in such a way that each plantation caters to the needs of a village or a group of villages; creating necessary infrastructure for sustaining production of fodder materials and seeds of fodder grases, legumes and trees to distribute to the public and adopting cut and carry system for regulating the distribution of fodder materials.

D. Character of vegetation.

15.1.4. The areas alloted to this working circle are mostly the degraded dry deciduous forests, mostly in the foot-hills. The vegetation comprises mostly of non-palatable species and the proportion of non-palatable species is steadily increasing ; This trend has to be handled.

Section 2—Division of the area.

15.2.1. A total area of about 900 hectares are alloted for development of silvipasture plantation. The areas included are .—

1. Srivilliputhur R.F.	..	500 hec.
2. Sethur R.L.	..	250 hect.
3. Sappaniparambu R.F.	..	50 hect.
4. Valaikulam Prambur R.F.	..	50 hect.
5 Kothankulam R.F.	..	50 hect.
Total	..	900 hect.

B. Schedule of Planning.

	87	88	89	90	910
Srivilliputhur	100	100	100	100	100
Seihur R.L.	50	50	50	50	50
Sapprani prambuR.F.	10	10	10	10	10
Valaikulam prambu ..	10	10	10	10	10
Kothankulam R.F. ..	10	10	10	10	10

15.2.2. The areas planted in 1987 may again to resown with seeds in the year 1992 and so on. As the area is treated in a cycle of 5 years, even if the grass population is less, can be resorted again by reseeding.

Section 3—Methods of Treatment.

15.3.1. *General remarks.*—Lot of experience has been gained in the Draught Prone Area Programme (D.P.A.P.) regarding the techniques to be adopted for pasture development. The technical details recommended by the DPAP. division of Government of India is Described below.—(With suitable modification.)

15.3.2. *Choice of species.*—The following species are prescribed for planting. However, among trees, only only pod fodder trees are to be preferred as it is difficult to manage the folliage fodder species under dry conditions.

Wherever the co-operative societies come forward to harvest the foliage fodder species may also be planted.

(i) *Grasses*:

Cenchrus ciliaris.

Cenchrus setigerus.

Pennisethm pedicellatum

Schima nervosum.

(ii) *Legumes* :

Stylosanthes hamata.

Stylosanthes humilis.

Vigna sinensis.

Glycine Javanica.

(iii) *Trees* .

A. *Foliage fodder.*

Moringa oleifera.

Sesbania grandiflora.

Leucaena leucocephala.

B. *Bed fodder* :

Prosopis cinereria

Acacia leucophiloea.

Acacia nilotica.

Prosopis Juliflora.

Enterolobium saman

Pithecolobium dulse.

15.3.3. *Site selection and demarcation*.—The areas allocated to this working circle are mostly the degraded forest areas mainly in the interface corridor region abutting the agricultural lands. The area is allocated in such a way that each plot can cater to the needs of a village/group of villages. The areas allocated are indicated in the map. Each site has to be demarcated by planting with root suckers of Agave veracruz.

15.3.4. *Protection arrangements*.—No fodder plantation should be raised without pucca fencing arrangements. Full proof fencing arrangements should be provided in the form and stone wall. Village committees should be formed wherever possible to manage the fodder plantations.

15.3.5. *Blot mazdoors*.—A plot mazdoor should be appointed in the month of May and specific works assigned to him for each day. The following works may be assigned to him :—

1. Protecting the pasture from grazing.
2. Erecting fencing.
3. Repairing fencing.
4. Strengthening fencing.
5. Protecting fencing.
6. Procuring labour.
7. Assisting in alignment.
8. Supervising harvesting.
9. Sowing of seeds whenever needed.
10. Continuously Impsoving the pasture plot.

15.3.6. *Fencing*.—A fool proof fencing should be erected one year in advance of planting to make it more effective and to avoid the delay in fencing after raising the plantation.

15.3.7. *Trench mound*.—A trench in 1m width 90cm depth should be dug all around the plantation; the dug out earth should be heaped on the outerside and a maund by consolidating the dug out earth. Seeds of Karuvel or prosopis or Kodukkapuli should be sown or root suckers of Agave veraxruz or cuttings of Euphorbia nivuli, Balasamodendron beryii etc., be palnted on the heaped mounds. The seeds should be sown during the on set of south west monsoon in the first fortnight of June.

15.3.8. *Stone wall*.—Of all the fencing methods, this is considered to be the most effective methods; wherever stones are available or wherever stones can be made available at a cheaper cost, this method has to be adopted. Dry packing of loose stone (Preferably by the tribes who are experts in this works) of 120 cm height, 90 cm. bottom width and 60 cm of top width has to be erected all around the plantation. One of the limiting factor in this case is that stones may fall apart in certain places which can be easily repaired by the plot mazdoor.

15.3.9. *Chainlink*.—This is a very costly affair even though fully effective. This may be preferred when the first two alternatives are not possible.

15.3.10. *Barbed wire*.—Should not be restored to.

15.3.11. *Soil/moisure conservation works*.—Before taking up pasture development all kinds of soil moisture conservation works that can be undertaken in the selected area are to be carried out. Moisture availability increase the productivity by manyfold. Hence all efforts are to be made to conserve the soil, the medium of plant growth, and the moisure the critical input in biological production Works like contour trenching/bunding, gully plugging etc. are to be carried out.

15.3.12. *Site preparation*.—(1) Complete clearing and uprootal of all vegetation (excluding the standing trees, palatable grasses and shrubs) are prescribed.

(2) In non-hilly tract, tractor ploughing is prescribed and is considered to be more economical when compared to cattle-ploughing.

(3) In hilly terrain 'V' shaped furrows along the contour at two metres intervals with plough or manual labour is prescribed.

15.3.13. *Fertilizer and manur application*.—Area proposed to be tackled are completely degraded and denuded and as suh devoid of plant nutrients. Hence plant nutrients are highly required for increasing the productivity of the site. Hence provisions has to be made for application of fertilizers and manures; spreading of 12 tonnes of compost or cow dung manureper heact is recommended. Nitrogenous fertilizers in the form of urea at 10 Kg. per Hec. can be used as top dressing. But its application should be done only on a good rainy day. In case of practical difficulties, this step may be omitted.

15.3.14. *Pre-treatment of seeds* :—

1. Before sowing, pelleting of 2 Kgs., of seeds with, compost and soil in the ratio of 1 : 3 mixed with 20 Kg. of super phosphate may be done for grass species.

2. Pelleting of 2 Kgs. of stylosanthes seeds with compost and soil in the ratio of 1 : 3 mixed with 20 Kgs., of super phosphate and rhizobium culture at the rate of one pocket per Kgs., of seed may be done.

3. Treated and pelleted seeds should be stored in a cool dry place.

15.3.15. *Quantity of seeds* :

1. Normally 3 Kgs. of stylosanthes seeds and 5 Kgs., of grass seeds are considered adequate.

2. In the case of hill areas depending upon the effective area available, the seed requirement may vary.

15.3.16. *Sowing* :—

1. Sowing may be done preferably on a rainy day just during the onset of south-west monsoon in the mo th of June-July.

2. In the case of non-hilly terrain broad cast sowing is prescribed.

3. In the case of hilly terrain, 2 Kgs., of stylosanthes seeds may be sown in lies on the berms of 'V' shaped furrows and then to be covered with soil by drawing wire brush or brush-wood lightly on the lines so that seeds are burried deep in the soil. Again a mixuture of 1 Kgs., of stylo seeds and 5 Kgs., of grass seeds per ha may be broad cast down.

15.3.17. *Planting of fodder trees* :

1. Espacement—10m x 10m.

2. Pitting size : 45cm x 45cm x 45 cm.

3. Time of planting : July—August.

4. Choise of species : already listed.

15.3.18. *Maintenance of fodder plantations.*—If monsoons fails or a long dry spell occurs resulting in killing of germinated seedings, resowing of the area is recommended. In the same manner if there is casualty among the tree seedlings, the same may be beaten up in subse quent year. The sowing of seedlings of grasses and legumes may be carried out whenever necessitated. One plot watcher should be put incharge of each silvipasture plantation so that he can attend to works of resowing and restocking.

15.3.19. *System of management.*—Grasses and legumes should be allowed to grow and seed for the first 2 years. From third year onwards, grasses and legumes can be removed by adopting cut carry stem. The scientific grazing systems like rotational grazing, deferred grazing etc., are not suitable under our conditions. Wherever these systems were adopted, the fodder programme in such areas was a miserable failure. Hence cut and carry system has to be followed. Distributions of the fodder materials may be channelised through dairy development, co-operative societies of through the sheep co-operative societies. Free for all methods should not be encouraged. Cut and carry system can be adopted from 3rd year on wards. In case if the fodder production decreases after 5th year, the area may be resown by adopting procedure outlined. As envisaged in the objectives seed packets may be prepared by collecting seeds of grasses and legumes from these plots and may be distributed to the local villagers for propagating in their farme lands. Wherever co-operative societies are not existing, efforts shall be made to form sheep/Dairy co-operative societies.

15.3.20. *Seed multiplication centres.*—Large quantities of seed of the grasses and legumes are required for embarking on a large scale pasture development programme. Hence as there is likely-hood of a shortage of these seeds, separate seed multiplication centres are to be formed and the centres have to be provided with the following facilities.

1. Watering facilities in the form of well and electric pumpsets.

2. Pucca fencing arrangement.

3. Well laid out paths.

4. Shed for storage of inputs like fertilizer and pesticides and outputs like seeds.

5. Planning for seed multiplication should be made one year in advance of taking up of pasture development programme. Incidentally these seed multiplication centres can cater to the needs of not only our programmes but also to supply to the local people. Each section can have one seed multiplication centre. Before establishing these centres it is essential to inspect similar centres maintained by animal husbandry Department.

SECTION—4.

GRAZING PERMITS.

15.4.1. *Discussion.*—For every division, target is fixed by the Government for issuing permits and for revenue collection. This is distributed to various ranges. This target is fixed not on the basis of the carrying capacity of the forest or on the basis of any scientific concept. Unregulated grazing, and over utilisation of biomass will lead to lack of regeneration of useful species. This will ultimately result in complete loss of potential for fodder production as can be seen in many of our forest areas today where only non-palatable species are thriving mostly. To obviate this we may have to carry-out.

1. First the carrying capacity of each and every R.F., has to be scientifically assessed.

2. Permits are to be restricted to the milch cattle, high yielding cattle or sheep and permits shall be linked to sheep and dairy co-operative societies only. All the useless cattle which can at the most contribute only cattle dung should be discouraged from grazing inside forests.

15.4.2. The present rate grazing fee is Rs. 2 per cow and bullocks, Rs. 4 for Buffaloes and one rupee for sheep. An estimate mad shows that the forest meet the entire nutrient requirement of these cattle for atleast 5 months period during the rainy season and partial requirement during the other period. The value of the fodder.

consumed per day can safely be assumed to be Re. 1 day. Thus a cattle consumes fodder worth about Rs. 200 in a year for mere payment of Rs. 2. Unregulated issuing of permits combined with low permit rates is bound to increase the number of useless cattle in and around forests. The best solution is, that all the degraded forest lands should be closed to grazing and cut and carry system has to be enforced.

15.4.3. When we are issuing permits to all the cattle, and when the permit cost is so cheap, will we be in a position to market the fodder materials that we are going to produce? So far all out attempts in marketing the fodder materials from our forests has not been very encouraging. If the fodder material is not marketable how are we going to distribute if? Free of cost? to whom? to all? to selected beneficiaries? Will the system tolerate this? Will there be antagonism from others? These are all the factors to be considered.

15.4.4. *Recommendation.*—Taking into consideration all the above points, the following are recommended.

1. Permits should not be issued for the areas covered under the protection oriented working circle areas.

2. Permits shall be restricted on the basis of the carrying capacity of each forest tract.

3. Permits should be restricted to the member of the Milch/sheep/dairy co-operative societies; permits should not be issued to other cattle.

4. (Let us not accelerate desertification of forest areas by indulging in unscientific grazing policy by succumbing to the local pressure).

SECTION—5.

CONTROL.

15.5.1. The control records prescribed for this working circle are given in Appendix XIII (4).

Control.—A control journal, a control book, plantation and nursery journals, a record of works and control maps will be maintained for this working circle. This should be posted soon after the close of each financial year. The posting and maintenance of control records and maps in a matter of vital importance and must receive the personal attention of the District Forest Officer.

15.5.2. *Control journal.*—The control journal will gave detailed account of the management of the Range. The object of this journal is secure running commentary on all objects of administration specially on the extent to which the object of the working plan have been realised and the extent to which the method prescribed have been found suitable in the control Book and the records of works. The journal is intended to be given the district Forest Officer an opportunity for recording suggestions for modifications and improvements in the methods of working laid down in the working plan. The journal should therefore be taken into camp by the District Forest Officer and critical observations should be recorded in it during of after inspection. The control journal is a technical record and must be personally maintained by the District Forest Officer. A copy of the entries made during the year should be submitted to the Conservator of Forests, soon after close of each financial year along with copy of the deviation statement the control forms and Maps. All the works carried out under the prescription of the working plan as well as such measures as are neither prescribed nor suggested but are carried out should be recorded in this, form "Record of Works"

15.5.3. *Plantation journal.*—A plantations journal will be maintained which should contain the name and year of the plantation, its location area, the nature of the previous growth the revenue obtained by clearing growth the details and cost of formation of the plantation and further history like thinning and revenue realised thereby.

15.5.4. *Nursery Jourel.*—A nursery journal will be maintained for each years nursery showing its location and number, size of beds species sown origin, date of sowing nursery technique adopted, watering regime, cost of maintenance etc.

Both nursery journal and plantation journal will be maintained personally by the Range Officer. Inspecting Officers will note their remarks on these journal which will be replied to by the Range Officer. Copies of the journal will be maintained at the District Forest Officer also.

15.5.5. *Control Maps.*—Control maps should show all operations actually carried out in connection with the exploitation in each series as per prescriptions of the working plan as well as such measures as are neither prescribed nor suggested but are carried out.

So the control maps should be a convenient scale of the area annually regenerated with name of the species plated and with the dates of the original planting and they should kept as bound register at District Forest Officer's Office. Sample control forms to be posted by the end of each financial year for this working circle are appended.

CHAPTER—16.

SANDALWOOD OVERLAPPING WORKING CIRCLE.

Sections: 1—General constitution of the Working Circle and character of vegetation.

16.1.1. This working circle includes whole of Alagarkoil Valley in Srivilliputhur Range extending over 1972.02 ha.

Division of the area into felling series :—

16.1.2. Only Alagarkoil Sandal felling series is prescribed.

Character of vegetation .—

16.1.3. Forest Type 5A/C3 Souther Dry Mixed Deciduous forests are generally met with in this working circle. Over the years Sandal population has decreased and hence there is need to increase the population of Sandal.

Object of management .—

16.1.4. Systematic exploitation of dead Sandalwood trees.

SECTION—2.

BLOCKS AND COMPARTMENTS.

16.2.1. The series will be divided into three blocks namely :—

1. Pudupatti.
2. Alagarkoil and
3. Athithondu.

SECTION—3.

ANALYSIS AND VALUATION OF THE CROW.

16.3.1. Sandal is scattered in the Alagarkoil Valley series, occuring as isolated stems or in small groups. No enumeration of the growing stock was considered necessary as there is no spike disease in the area and only dead sandalwood trees will be extracted. There are no series of age gradation in the natural sandal population.

SECTION—4.

METHOD OF TREATMENT.

16.4.1. *Silvicultural System.*—Selection system. Only dead trees will be extracted as per extraction rules in force. In addition all greentrees broken by wind, elephants, or by any other cause will be felled. All such trees or parts of trees shall also be exploited and brought to stock.

16.4.2. *Regulation of yield.*—The yield will be regulated by area; but however forecast of yield cannot be made. However a study made in the last few years extraction reveals that about a hundred trees are extracted annually yielding about 3 tonnes.

16.4.3. *Rotation.*—Only physical rotation is prescribed since only dead trees are being extracted.

16.4.4. *Felling Cycle.*—Annual. The area is small and the respective protectivestaff can cover the area easily and bring the dead trees to depot instead of allowingthem to deteriorate for 2 to 3 years in the open jungle.

16.4.5. *Method of execution felling.*—This shall be done as per Sandalwood extraction rules in force.

16.4.6. *Agency of felling and extraction.*—Only departmental extraction shall be done.

16.4.7. *Regneration.*—The area will fall within the eco-preservation and Wild Life habitate improvement working circles. Besides sandal seedlings can be pricked into containers of seedling raised for various purpose and planted out. No Separate area is required or allocated. Seeds may be collected and may be sown by broadcast method in the entire Alagar Valley.

16.4.8. *Grazing.*—Grazing should be strictly excluded from the area.

16.4.9. *Fire Protection.*—The twin causes of fire are graziers and collectors of Minor Forest Produce. Excluding grazing from the entire forest and departmental collection of Minor Forest Produce along can solve the problem. If they cannot, nothing will. However fire tracing the outer boundaries shall be done each year.

16.4.10. *Control.*— Acontrol journal, a control book, plantation and nursery journal, a record of works and control maps will be maintained for this working circle. This should be posted soon after the close of each financial year. The posting and maintenance of control records and maps is a matter of vital importance and must receive the personal attention of the District Forest Officer.

16.4.11. *Control journal.*—The conttol journal will give a detailed account of the mangement of the Range. The object of this journal is secure a running commentary on all objects of administration specially on the extent to which the object of the working plan have been realised and the extent to which the method prescribed have been found suitable in the control book and the records of works. The journal is intended to be given the District Forest Officer an opportunity for recording suggestions for modifications and improvements in the methods of working laid down in the working plan. The journal should therefore be taken into camp by the District Forest Officer and critical observation should be recorded in it during or after inspection The control journal is a technical record and must be personally maintained by the District Forest Officer. A copy of the entries made during the year should be submitted to the Conservator of Forests soon after close of each financial year along with copy of the deviation statement, the control forms and maps. All the works carried out under the prescription of the working plan as well as such measures as are neither prescribed nor suggested but are carried out should be recorded in this form "Record of works".

16.4.12. *Plantation journal.*—A plantation journal will be maintained which should contain the name and year of the plantation, its location area, the nature of the previous growth, the revenue obtained by clearing growth the details and cost of formation of the plantation and further history like thinning and revenue realised there by

16.4.13. *Nursery journal.*—A nursery journal will be maintained for each years nursery showing its location and number, size of beds species sown origin date of sowing, nursery technique adopted, watering regime, cost of mainteinance etc.

Both the nursery journal and plantation journal will be maintained personally by the Range Officer. Inspecting officers will note their remarks on these journals which will be replied to by the Range Officer. Copies of the journal will be maintained at the District Forest Office also.

16.4.14. *Control Maps.*—Control maps should show all operations actually carried out on connection with the exploitation in each series as per prescription of the working Plan as well as such measures as are neither prescribed nor suggested but are carried out.

So the control maps should be a convenient scale of the area annually regenerated with name of the species planted and with the dates of the original planting and they should kept as bound register at District Forest Officer's Office. Sample control forms to be posted by the end of each financial year for this working circle are appended.

CHAPTER—17

MINOR FOREST PRODUCE WORKING CIRCLE.

(Tribal Welfare Working Circle.)

General construction of working circle and character of vegitation.

17.1.1. *General remarks.*— This working circle includes the entire natural forest areas as well as the existing successful tamarind plantations. The various items of the M.F.P. are given in section 3.

17.1.2. *Objects of managements.*—To systematically collect the various M.F.P. items that are found in this Division by engaging the local tribal people called "Palayas ".

17.1.3. *Character of vegetation.*—The areas allocated to this working circle are mostly the tropical evergreen and tropical deciduous forests. The mixture of various M.F.P. Tress varies from place to place and higher concentration of M.F.P. trees can be seen all along the river margins.

SECTION—2.

ALLOTMENT OF AREAS.

17.2.1. The areas allotted to this working circle are partly non-overlapping with eco-preservation working circle The non-overlapping part includes the existing tamarind plantations which are listed out in Table 16-1 the unsuccessful tamarind plantations are listed out in the Table *16-2*, and all the unsuccessful areas are allotted to the energy wood and silvipasture working circles. The overlapping part encompasses almost the entire forest tract of this Division.

TABLE—16.1.

Serial number.	*Name of plantation.*		*Area in Survival (ha.)*	*Survivalpercentage.*
(1)	(2)		(3)	(4)
1	1958	Pravadiar	8	50
2	1962	Pulpathy	4	15
3	1963	Pulpathy	4	15
4	1963	Deviar	10	15
5	1966	Pulpathy-I	10	62
6	1966	Deviar	10	40
7	1972	Deviar	21	63
8	1973	Kunnur	2	NA
9	1975	Pravadiar	43	95
10	1975	Navaloothu	21	95
11	1976	Navaloothu	50	75
12	1977	Kunnur	5	N.A.
13	1979	Pulpathy	15	5 per cent.
14	1980	Pulpathy	12	55 per cent.
15	1984	Sappaniparambu	7	40
16		Pravadiar	19	75
		Total ..	261	

TABLE—16.2.

1	1961	Pulpathy	4.04
2	1964	Pulpathy	4.04
3	1965	Pulpathy	4.04
4	1966	Pulpathy II	4.05
5	1967	Pulpathy	2.02
6	1968	Pulpathy	10.12
7	1969	Pulpathy	4.00
8	1970	Pulpathy	4.00
9	1972	Navaloothu	57.50
10	1972	Pravadiar	34.30
11	1973	Navaloothu	50.00
12	1974	Pravadiar	63.70
13	1976	Kunnur	2.00
14	1980	Rengartheertham	20.00
15	1981	Deviar	21.80
16	1982	Pulpathy	17.30
17	1982	Maruthadi	4.00
18	1983	Kansapuram	10.00
19	1983	Pulpathy	10.00

59-1—19

SECTION—3.

17.3.1. *Analysis and valuation of the crop.*—The main items of Minor Forest Produce collected in this Division other than tamarind are thatching and broomstick grasses, limbers for basket making and curry leaves.

The various M.F.P. yielding species and the various parts collected are listed out below. If any other species whose produces are in demand are found it can be added to this list.

A. PLANTATION PRODUCE.

Serial number.	*Botanical Name.*	*Tamil Name.*	*Description of the produce.*
(1)	(2)	(3)	(4)
1	Acacia Concimnna	Siyakkai	Pods.
2	Androrogon species	Broomstickgrass.	Stem with leaves.
3	Acacia instia	Indu.	Bark.
4	Anacardium Occidentale	Mundhiri	Fruit and nut (Only in Rajapalayam Range).
5	Borassus flallifer	Panai	Fruit and leaves.
6	Cassia auriculata	Avaram.	Bark.
7	Eletteria Cardamomum	Cardomum.	Fruits.
8	Elblica officinalis	Nelli.	Fruits.
9	Helecteres Isora	Valamburi.	Bark.
10	Mangifera Indica	Mango.	Fruits.
11	Murraya Koenigil	Karivellpillai	Leaves.
12	Pandanus Odoritissima	Thazhai.	Flower.
13	Derris Indica	Pungam.	Fruits.
14	Sapindus emarginatus	Soapnut.	Fruit.
15	Strychnus nuxvomica	Etti.	Seeds.
16	Strychnus Potatorum	Thethankottai	Seeds.
17	Syzizum Cuminii	Naval.	Fruits.
18	Terminalia Bellerica	Thani.	Seed.
19	Terminalia Chebula	Kadukkai.	Fruits.
20	Ziziphus Jujuba	Elandai.	Fruits.
21	Cymbopogon species	Thatch grass.	Stems and leaves.

B. In addition to the above listed plant items the following animal products are also importance.

22 Honey and Wax.

23 Ivory.

24 Deer and Sambar horns.

25 Valuable remains of animals.

SECTION—4.

METHOD TO BE ADOPTED.

17.4.1. *Regeneration.*—No fresh planting of any minor Forest Produce species is prescribed. However showing of seeds of Annona squamosa and Emblica Officianales, in selected areas is recommended.

17.4.2. *Agency of Collection.*—It was observed that adopting private contractual agency for collection of M.F.P· items results in clearing of the growth near the tamarind trees, causing fire in certain areas and in illicit felling of tree. Hence private contractors shall not be allowed inside the forests for collection of M.F.P. itemes Collection of M.F.P., items in the habitat of the Grizzled giant. squirrels is completely banned, and hence collection of M.F.P. items in Alagarkoil Valley should not be resorted to. The agency of collection shall be department and wherever difficulties are experienced collection may be done by co-operative agencies. As enquiries revea some of the politically powerfull people are presently collection the M.F.P. items in the name of tribal co-operative societies where the benefit is not favouring to the tribals who are engaged in actual collection. It appears that the District Forest Administration is helplessly watching this situation. As this working circle aims at tribal welfare, only tribal people are to be engaged in departmental collection.

17.4.3. *Unit of collection.*—Each beat shall be constituted as a unit of collection for all kinds of M.F.P. items However splitting the beats into the subtunits may be resorted if considered necessary. This should be done at the discretion of the District Forest Officer. The present 21 beats shall be treated as 21 units for M.F.P. collection.

17.4.4. *Period of lease.*—The lease period for all the M.F.P. units shall be for the fasli year from 1st July to the 30th of the succeeding June.

17.4.5. *Rotation.*—The question of rotation does not arise since only usufructs are collected annually. However, any of the M.F.P. tree dies, the same has to be felled departmentally and may be sold in open auction.

SECTION—5.

17.5.1. *Control.*—A control journal, a control book, plantation and nursery journals, a record of works and control maps will be maintained for this working circle. This should be posted soon after the close of each financial year. The posting and maintenance of control records and maps is a matter of vital importance and must receive the personal attention of the District Forest Officer.

17.5.2. *Control journal.*—The control journal will give a detailed account of the management of the Range. The object of this journal is secure a running commentary on all objects of administration specially on the extent to which the object of working plan have been realised and the extent to which the method prescribed have been found suitable in the control book and the records of works. The journal is intended to be given the District Forest Officer an opportunity for recording suggestions fee modfications and improvements in the methods of working laid down in the working plan. The journal should be therefore be taken into camp by the District Forest Officer and critical observations should be recorded in it during or after inspection. The control journals a technical record and must be personally maintained by the District Forest Officer. A copy of the entries made during the year should be submitted to the Conservator of Forests, soon after close of each financial year along with copy of the deviation statement, the control forms and maps. All the works carried out under the prescription of the working plan as well as such measures as are neither prescribed for suggested but are carried out, should be recorded in this form "Record of works".

17.5.3. *Plantation journal.*—A plantation journal will be maintained which should contain the name and year of the plantation, its location area, the nature of the previous growth, the revenue obtained by clearing growth the details and cost of formation of the plantation and further history will thinning and revenue realised thereby.

17.5.4. *Nursery Journal.*—A nursery journal will be maintained for each years nursery showing its location and number, size beds species sown origin. date of showing nursery technique adopted watering regime cost of maintenance etc.

Both the nursery journal and plantation journal will be maintained personnally by the Range Officer. Inspecting officers will note their remarks on these journals which will be replied to by the Range Officer. Copies of the journal will be maintained at the District Forest Officer also.

17.5.5. *Control maps.*—Control maps should show operations actually carried out in connection with the exploitation in each series as per prescriptions of the working plan as well as such measures as are neither prescribed nor suggested but are carried out.

So the control maps should be convenient scale of the areas annually regenerated with name of the species planted and with the dates of the original planting and they should kept as bound register at District Forest Officer's Office. Sample control forms to be posted by the end of each financial year for this working circle are appended.

SECTION—6.

OTHER REGULATIONS.

17.6.1. *Alagarkoil Valley.*—Tamarind fruits or other tree usufructs shoud not be collected in the habitat of the grizzled giant squirrel as it will disturb the feeding and breeding behaviour of this species which is confined only to this region.

17.6.2. *Medicinal plants.*—Detailed study has to be made on the availablity of the Medicinal plants of this region. Some of the Educational Institutions (Like the Tirunelveli Sidda College) may be requested to undertake a study on the medicinal plants. Intelligence reports may be collected regarding export of Medicinal herbs that are exported are collected from the Western Ghat region.

CHAPTER—18,

Miscellaneous Regulations.—The matters which could not be treated under the various working circle are discussed in this chapter as they are of considerable importance in the efficient management of the forests.

18.1.1. *Palmyrah planting.*—This division being in the drought prone area, raising of Palmyra, trees looks bright. There are a good number of palmyra trees seen on either side of the road leading to Senbagathope. So if along the best boundaries of R.F. the Palmyra seeds are dibbled at an internal of 2 metres in due course it will act as a natural boundary and will become as one of the main M.F.P., yielding item. Good palmyra seeds can be obtained from the palmyra research centre in Srivilliputhur.

18.1.2. *Agave planting.*—In the R.Fs., where the desertification is progressing fast and the soil eroded with boulders, Agave can be planted along the contour in. slopes at sufficient internal between the contour depending upon the slope of the terrain This can be done almost in all the R.Fs. and along the boundary of the forest too.

In the following R.F., areas of this division, Agave planting has to be done. Agave planting will be taken up not only for its M.F.P. value, but also to consolidate the existing R.F., so that encroachment may be avoided. During the plan period it is prescribed to plan 4 rows of Agave planting the periphery or along the foot hills of the entire R.F., area at the espacement of 1m x 1m. Apart from this, Agave planting has also to be done all along the boundaries of all the plantations that are going to be raised during the plan period. 100 Km, has to be taken for Agave planting for each range at the rate of 10 Km., per year.

Serial number.	*Name of the Range.*	*Name of the R.F.,*	
(1)	(2)	(3)	
1.	Srivilliputhur Range.	1. Srivilliputhur R.F., (Lower slope). 2. Unnipattimalai 3. Khansapuram R.Fs.	100 Km.
2.	Rajapalayam Range.	1. Srivilliputhur R.F., (Lower) 2. Sappaniparamb R.F., 3. Valaikulam Parambu R.F., 4. Kollakondan R.F.s. I & II. 5. Kothankulam R.F., 6. Seithur R.L. ..	100 Km.

Choise of species: Agave sisalana.

Agave bulbuls are available in plenty both in Bhuvaneswar (Oriea) and Mandya (Karnataka) So Bulbuls have to bring from either of the places and raise nursery conveniently. Agave is a good fibre yielr plant and it comes up well in a variety of odd soils. It requires very little care and being its Xerodhytic nature, it comes up well in Kamarajar Forest Division Agave nursery was raised abundantly without any difficulty in Varashannadu hills to take up agave planting in large scale. So agave cultivat on and extrartion of fibre will create lo of employment opportunities to the rural fol and thereby the economy of the rural people will be uplifted. Agave will be used for extraction of fibre, Alcohal chemical and currency note making etc., Besides it will act as a vegetative fence and vegetative check-dams to conserve soil.

18.1.3. *R.F., boundary maintenance.*—The R.F., boundary through out the length needs clearance even though a small bridal path is existing now. But it many places the overhanding branches and bushes are to be cleared and in certain places the boundary has to be cleared to widen it so that the boundary is clear of jungle growth to uniform width. All the R.F., pillars have to be white washed periodically and numbered by black paint for a easy locating.

18.1.4. *Bride path maintenance.*— The bridle paths that are present in various R.F.s., particularly in picnic spots are to be cleared periodically so that it can be used for inspection throughout the year.

18.1.5. *D.P.A.P. Works.*—Under D.P.A.P., more soil and moisture conservation works can be carried in order to improve the hydrollogical resources of this rtract.

18.1.6. *Fire protection.* In all the fire prone areas along the boundary, the fire line has to be cleared annually and in the vulnerable places the fire line can be cleared to a considerable width and agave can be plated in 3 to 5 rows so that escape of fire inside the R.F., can be prevented.

18.1.7. *Buildings maintenance.*—The annual maintenance of all the departmental buildings shall be carried out. Wherever the subordinates are not provided with quarters. Departmental residential quarters are to be proposed and constructed in a phased manner.

18.1.8. *Installation of Rainguage.* Raing age are to be installed at Mudangiar and Srivilliduthur for recording the rainfall and maintained properly so that adequate statistics can be collected to regulate planting and other operations.

18.1.9. *Patta Sandal.*—There are small Sandal trees found in the Shenbagavalley. This area is now being gradually conveted into agricultural fields for intensive cultivation of cash crops. Anyhow there are some mature sandal trees. The extraction by the pattadar shall be regulated as per the existing rules under the close watch of the forest Officials.

18.1.10. *Farm Forestry.*—In order to achieve the optimum area coverage by forest cover of 33 percent there is an intensive drive of planting of misc species in all available Government lands outside R.F., area. Now this has been taken over by social Forestry under I.D.A. Project. Vigorous campaign has to be done for promoting planting of fuelwaod trees in the available Patta lands involving the public by the Social Forestry Divsion, Srivilliputhur.

18.1.11. *Control.*—A control, journal, a control book plantation and nursery journals, a record of works and control maps will be maintained for this working circle. This should be posted soon after the close of each financial year. The posting and maintenance of control records and maps is a matter of vital importance and must receive the personal attention of the District Forest Officer.

18.1.2. *Control journal.*—The control journal will give a detailed account of the management of the range. The object of this journal is secure a running commentary on all objects of administration specially on the extent to which the object of the working Plan have been realised and the extend to which the meth od rescribed have been found suitable in the control book and the records of works. The journal is intended to be given the District Forest Officer an opportunity for recording suggestions for modifications and improvements in the methods of working laid down in the working plan. The journal should therefore be taken into camp by the District Forest Officer and critical observations should be recorded in it during or after inspection. The control journal is a technical record and must be personnally maintained by the District Forest Officer. A copy of the entries made during the year should be submitted to the Conservator of Forest, soon after close of each financial year along with copy of the deviation statement, the control forms and maps. All the works carried out under the prescription of the working plan as well as such measures as are neither prescribed not suggested but are carried out should be recorded in this form "Record of works."

18.1.13. *Plantation journal*.—A plantation journal will be maintained which should contain the name and year of the plantation, its location area, the nature of the previous growth, the revenue obtained by clearing growth the details and cost of formation of the plantation and further history like thinning and revenue realised there by.

18.1.14. *Nursery journal*.—A nursery journal will be maintained for each years nursery showing its location and number, size of beds species sown origin, size of beds species sown origin, date of sowing nursery technique adopted, watering regime, fcost of maintenance etc..

Both the nursery journal and plantation journal will be maintained personally by the Range Officer. Inspecting officers will note their remarks on these journal: which will be replied to by the Range Officer. Copies of the journal will be maintained at the District Forest Officer also.

18.1.15. *Control Maps*.—Control maps should show all operations actually carried out in connection with the exploitation in each series as per prescriptions of the working plan as well as such measures as are neither prescribed nor suggested but are carried out.

So the control maps should be a convenient scale of the areas annually regenerated with name of the species planted and with the dates of the original planting and they should kept as bound register at District Forest Officer's Office. Sample control forms to be posted by the end of each financial year for this working circle are appended.

59-1-20

CHAPTER—19.

ESTABLISHMENT AND LABOUR.

SECTION—1. ESTABLISHMENT.

19.1.1. This Division is a newly formed one. The sanctioned strength of the staff has been furnished in Chapter—IV of Part—I. Hence more staff are not proposed.

19.1.2. As the proposal of forming the Megamalai Wild Life Sanctuary is at the threshold of sanction by the Government, and as the major part of this division falls within the jurisdiction of the proposed sanctuary, rearrangement of jurisdiction is not contemplated here.

SECTION—2. LABOUR.

19.2.1. Labour availability and supply is adequate and there may not be any problem for carrying forestry works.

CHAPTER—20.

COST OF WORKING PLAN AND FINANCIAL FORECAST.

SECTION—1.

COST OF WORKING PLAN.

Serial number.	*Category.*	*Rupees.*
(1)	(2)	(3)
1.	Pay	1,52,000.00
2.	Dearness allowance	23,000.00
3.	Additional D.A.	16,000.00
4.	Medical charges	2,000.00
5.	Other allowances	25,000.00
6	Travel concession	2,000.00
7.	Travelling allowances	33,000.00
8.	Office expenses	8,000.00
9.	Rents, Rates and taxes ..	12,000.00
10.	Motor Vehicles—	
	(i) Cost of fuels	6,000.00
	(ii) Maintenance	2,000.00
	(iii) Total	8,000.00
	Total ..	2,91,000.00

NOTE.—This details to the period of April 1986 to December 1986.

SECTION—2.

FINANCIAL FORECAST.

20.2.1. The estimated revenue and expenditure under each working circle for this plan period are given in the following statement.

ECO. PRESERVATION WORKING CIRCLE.

Year.	*Revenue.*	*Expenditure in thousands.*
(1)	(2)	(3)
1987—88	Nil	52
1988—89	Nil	52
1989—90	Nil	52
1990—91	Nil	52
1991—92	Nil	52
1992—93	Nil	52
1993—94	Nil	52
1994—95	Nil	52
1995—96	Nil	52
1996—97	Nil	52

WILD LIFE HABITATION IMPROVEMENT WORKING CIRCLE.

1987—88	Nil	100
1988—89	Nil	100
1989—90	Nil	100
1990—91	Nil	100
1991—92	Nil	100
1992—93	Nil	100
1993—94	Nil	100
1994—95	Nil	100
1995—96	Nil	100
1996—97	Nil	100

WATERSHED MANAGEMENT

	Revenue in Thousands.	*Expenditure in thousands*
(1)	(2)	(3)
1987—88	Nil	50
1988—89	Nil	50
1989—90	Nil	50
1990—91	Nil	50
1991—92	Nil	50
1992—93	Nil	50
1993—94	Nil	50
1994—95	Nil	50
1995—96	Nil	50
1996—97	Nil	50

ENERGYWOOD WORKING CIRCLE

1987—88	Nil	400
1988—89	Nil	400
1989—90	Nil	400
1990—91	Nil	400
1991—92	Nil	400
1992—93	Nil	400
1993—94	Nil	400
1994—95	Nil	400
1995—96	Nil	400
1996—97	Nil	400

TEAK PLANTATION WORKING CIRCLE.

Year.	*Revenue in thousands.*	*Expenditure in thousands.*
(1)	(2)	(3)
1987—88	Nil	22
1988—89	Nil	22
1989—90	Nil	22
1990—91	Nil	22

(1)	(2)	(3)
1991—92 ..	Nil	22
1992—93 ..	Nil	22
1993—94 ..	Nil	22
1994—95 ..	Nil	22
1995—96 ..	Nil	22
1996—97 ..	Nil	22

MATCHWOOD WORKING CIRCLE.

1987—88 ..	Nil	42
1988—89 ..	Nil	42
1989—90 ..	Nil	42
1990—91 ..	Nil	42
1991—92 ..	Nil	42
1992—93 ..	Nil	42
1993—94 ..	Nil	42
1994—95 ..	Nil	42
1995—96 ..	Nil	42
1996—97 ..	Nil	42

Year.	Revenue in thousands.	Expenditure in thousands.
1987—38	Nil	1,440
1988—89	Nil	1,440
1989—90	Nil	1,440
1990—91	Nil	1,440
1991—92	Nil	1,440
1992—93	Nil	18
1993—94	Nil	18
1994—95	Nil	18
1995—96	Nil	18
1996—97	Nil	18
	Establishment.	
1987—88	Nil	941
1988—89	Nil	960
1989—90	Nil	979
1991—92	Nil	999
1992—93	Nil	1,019
1993—94	Nil	1,039
1994—95	Nil	1,081
1995—96	Nil	1,103
1996—97	Nil	1,125

(i) *Grazing* : An annual revenue of Rs. 20,000 year is expected during this plan period.

(ii) *Compounding fees* : An annual revenue of Rs. 50,000 year is expected during this plan period.

(iii) *Palmirah plantating.* : Annual expenditure of Rs. 1,000 is for diggling of palmyrah.

(iv) *Agave plantation* : Annual expenditure of Rs. 50,000 is expected.

(v) *F. boundary maintenance* : Annual expenditure of Rs. 5,000 is expected for R.F., boundary maintenance.

(vi) *Sandalwood* : An annual expenditure of Rs. 1,000 is expected for the extraction dead tress from the R.F.

The annual Revenue of Rs. 50,000 is expected during the plan period.

(vii) *M.F.P.* : An annual Revenue of Rs. 40,000 is expected during the plan period.

Rupees in thousands.

Year.	*Revenue.*	*Expenditure.*	*Surplus.*	*Deficit.*
(1)	(2)	(3)	(4)	(5)
1987—88 ..	160	3,113	..	2,953
1988—89 ..	160	3,132	..	2,972
1989—90 ..	160	3,151	..	2,991
1990—91 ..	175	3,151	..	2,996
1991—92 ..	216	3,191	..	2,975
1992—93 ..	317	1,789	..	1,472
1993—94 ..	243	1,810	..	1,567
1994—95 ..	2,188	1,833	357	..
1995—96 ..	2,160	1,853	307	..
1996—97 ..	2,160	1,877	283	..

20.2.3. This plan aims at improving productive capacity of energywood, matchwood, Timber Minor Forest Produce, pasture ecological status developing the Wild Life habitate, improving water holding capacity and conserving the nature.

20.2.4. Even though the forecast show deficit for the first six years of the plan period, by successfully implementing the schemes proposed the plan like raising of High Density short rotation crops the revenue will be increased considerable from seventh year onwards for the ensuing ten year as the return of fuel wood will be increased considerably as well as the yield of the M.F.P., will also be increased considerably.

CHAPTER—21

SUMMARY OF PRESCRIPTIONS.

Chapter—8 Basis of Proposals

SECTION—1.

GENERAL OBJECT OF MANAGEMENT.

The general principles involved in management are preserving and upgracing all the existing natural forests and its production capacity.

SECTION :2.– WORKING CIRCLES AND THEIR DISTRIBUTION

The working circle prescribed in this plan are **follows** :

1. Eco-preservation working circle.

2. Wild Life habitat improvement working circle.

3. Watershed management working circle.
4. Energywood working circle.
5. Teakwood working circle.
6. Matchwood working circle.
7. Silvi-pasture working circle.
8. Sandalwood working circle.
9. M.F.P. Working circle.

SECTION 3—PERIOD OF WORKING PLAN.

The plan period will be 10 years from April 1987 March 1997.

CHAPTER 9,

ECO-PRESERVATION WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION.

This working circle covers the tropical ever-green and tropical desciduous forest types found in the sheltered valleys of Iyyanarkoil and Alagarkoil and in the top one third portion of entire streted of the Western Ghats in this division.

SECTION 2—DIVISION OF THE AREA.

This working circle covers and area of 151 74 hects. in both the ranges of this Division.

SECTION 3—METHODS OF TREATMENT.

SECTION—4 CONTROL.
Control forms will be posted.

No clearing is prescribed and no fellings should also be done in this area. Grazing is also prohibited within this area. Treatment will be given by dividing the area into compartments of convenient size.

SECTION 5—OTHER REGULATIONS.

Fire lines are to be maintained. So penning should not be allowed. The paths leading to these areas should be closed.

CHAPTER 10.

WILD LIFE HABITAT IMPROVEMENT WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION.

The mammalian Fauna found in this division should be conserved along with other Wild Life.

SECTION 2—ALLOTMENT OF AREA.

This is an overlapping working circle covering an area of 15,174 hects.

SECTION 3—GRIZZLED GIANT SQUIRRELS

The various protection measures and improvements works for the habitat development are prescribed.

SECTION 4—MALABAR SQUIRRELS.

The habitat of the Malabar squirrels are to be improved as suggested for Grizzled Giant squirrel.

SECTION 5—ELEPHANT HABITAT IMPROVEMENT.

Broadcast sowing of seeds/palatable species to be done to provide more forage for the elephants.

SECTION 6—NILGIRIS TAHR HABITAT IMPROVEMENT.

Penning and grazzing of cattle should be stopped. Effective fire control measures to be executed for the habitat improvement.

CHAPTER 11.

WATERSHED MANAGEMENT WORKING CIRCLE.

SECTION 1—GENERAL CONSTRUCTION

Forest catchment area is to be protected on the princiles integrated watershed management.

SECTION 2—DIVISION OF THE AREA.

This is an overlapping working circle covering an area of 3,000 hectares in both the ranges.

SECTION 3—ETODS OF TREATMENT

Linear planting of Agave veracruz is prescribed along with construction of check-dams, circulation ponds and sediment trap pits to aument ground water re-charges.

SECTION 4.—CONTROL.

Control forms will be posted.

CHAPTER 12.

ENERGY -WOOD WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION

This working circle consists the degraded scrub areas in the foot-hills of western Ghats and in other isolated scrub forests.

SECTION 2.—DIVISION OF THE AREA.

The total area of this circle is 2,000 hects.

SECTION 3.—METHOD OF TREATMENT.

The system to be followed is complete clear-felling of the existing growth and planting with Prosopis juliflora.

Moisture and soil conservation measures such as construction of contour bunds gully plugging, contour trenching are prescribed.

Espacement to be adopted is 2 x 2m.

A rotation of 5 years is prescribed. Simple coppice system to be adopted. Felling has to be regulatec to provide round the year employment to the local habitual head loders. The plantation journal will be maintained.

SECTION 4—CONTROL.

Control forms will be posted.

CHAPTER—13.

TEAK-WOOD PLANTATION WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION

This working circle includes all the existing teak plantations in Kamarajar Division in addition to natural teak bearing areas.

SECTION 2—DIVISION OF THE AREA.

The total area of this Working circle 225 hectares.

SECTION 3—ANALYSIS AND VALUATION OF THE CROP.

The area selected are the existing teak plantation in Deviar series and Solacheri series.

SECTION 4 —METHOD OF TREATMENT.

Moisture conservation works such as contry bunding, contour trenching and gully plugging are prescribed. A rotation of 40 years is prescribed. Subject to reconsideration by the District Forest Officer with reference to biotic factors such as illicit removal. Selection system has to be adopted.

No fresh planting is prescribed.

CHAPTER—14.

MATCHWOOD PLANTATION WORKING CIRCLE.

SECTION 1 —GENERAL CONSTRUCTION.

This working circle includes all the existing matchwood plantation in the division. The object is to meet the demand for matchwood.

SECTION 2 —DIVISION OF THE AREA.

Total area of the working circle is 420 hects. covering the existing matchwood plantations in Seithur R.L.

SECTION 3 —ANALYSIS AND VALUATION OF THE CROP.

The stocking is generally satisfactory but the growth in general is unsatisfactory along the periphery and stream banks.

SECTION 4—METHOD OF TREATMENT.

To boost up the growth of the matchwood soil connervation and moisture conservation works like contour bunding contour trenching and gully plugging are prescribed. Selection is to be followed. A rotation of 30 years is prescribed and only the trees above 60 cms. girth at breast height are to be extracted. No fresh planting is prescribed. Control forms will be posted.

CHAPTER—15.

SILVIPASTURE WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION.

This working circle includes all the forests under the control of the Divison excepting the area closed to grazing and the areas uhder Eco-preservation Working Circle. The annual grazing notification will be publisheo in District Gazette in the month of May.

SECTION 2—DIVISION OF THE AREA.

The area allotted to this working circle are mostly the degraded dry deciduous forests mostly in the foot-hills. An area of 900 hectares are alloted under this working circle for raising fodder species at the rate of 180 hects., per year from 1987 to 1991. The areas are to be treated in a 5 year circle.

SECTION 3—METHOD OF TREATMENT.

Suitable forder species are to be raised and should be protected with pucca fence plot mazdoors should be appointed Soil and moisture conservation works should be carried out. Fertlizer and manual application is prescribed.

SECTION 4GRAZING PERMITS.

Permits should be issued by restricting as per the carrying capacity of each forester permits should not be issued for the areas covered under the protection oriented working circles. Permits should be restricted to the members of Dairy co-operative society.

SECTION 5—CONTROL.

Control forms will be posted.

CHAPTER—16.

SANDAL-WOOD WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION.

This is a overlapping working circle covering all Sandal bearing areas of Alagarkoil Valley, Srivilliputhur Range.

SECTION 2—DIVISION OF THE AREA.

The area of this Working circle is 1972 hects. There will be 3 series. namely Pudupatti, Alagarkoil and Athitondu.

SECTION 3—ANALYSIS AND VALUATION OF THE CROP.

Sandal is very scattered in the Alagarkoil valley and isolated in other two series. Spike diseas is not present Only dead trees will be extracted.

SECTION 4—METHOD OF TREATMENT.

Selection system will be followed. Only dead trees and those broken by elephant, and other causes will be extracted. Fire trees should be done annually. Control records will be posted.

CHAPTER—17.

MINOR FOREST PRODUCE WORKING CIRCLE.

SECTION 1—GENERAL CONSTITUTION.

This is a overlapping working circle consists of the entire natural forests as well as covered are mostly tropical ever-green and deciduous forests.

SECTION 2—DIVISION OF THE AREA

This working circle covers the entire division whose area is 26145.27 hects.

SECTION 3—ANALYSIS AND VALUATION OF THE CROP.

The main M.F.P., items is tamarind. The list of other M.F.P., yielding species is furnished.

SECTION 4—METHODS TO BE ADOPTED

No fresh planting will be prescribed. Sowing seeds of Annona squamosa and Emblica officinals in selected areas is recommended. Each beat is constituted as a unite of collection for M.F.P., items. The lease period will be the Fasli year from 1st July to the 30th June of the succeeding year.

SECTION 5—CONTROL.

Control records will be maintained.

CHAPTER—18.

MISCELLANEOUS REGULATIONS.

Agave planting is perscribed for its M.F.P., value and for consolidation of the R.F., boundary. For each Range planting target fixed is 10 Kms. per year.

Palmyrah seeds are to be dibbled along the R.F. and best boundaries at an interval of 2 meters is prescribed.

The R.F., boundary should be cleared annually throught out the length and the R.F., pillars to be white washed and numbered periodically.

The bridal paths should be cleared periodically for easy inspection. Fire line should be cleared annually and along these lines Agave should be planted.

The existing departmental buildings should be maintained annually and new departmental quarters should be constructed wherever subordinates are not provided with residential quarters. Rain gauged should be installed Mudangiar and Srivilliputhur.

CHAPTER—19.

ESTABLISHMENT AND LABOUR.

SECTION 1—ESTABLISHMENT.

The existing staff strength is furnished.

SECTION 2.

Sandalwood is extracted by engaging the hill tribes living at Shenbagathope 'Palayas'.

CHAPTER—20.

FINANCIAL FORE-CAST AND COST OF THE WORKING PLAN.

SECTION 1.—COST OF THE WORKING PLAN.

The expsnditure on the preparation of the Working Plan is furnished.

SECTION 2—FINANCIAL FORE-CAST.

An estimate of the probable revenue and expenditure under each working circle for the plan period is furnished along with total revenue and expenditure under miscellaneous items.

An abstract of anticipated revenue and expenditure for each year is furnished. The estimated annual revenue varies from Rs. 1,60,000 to Rs. 21,60,000 and expenditure from Rs. 31,13,000 to Rs. 18,77,000.

PART III.

INDEX.

APPENDICES.

I. List of Reserved Forests.

II. List of Reserved Lands.

III. List of Ranges, sections and beats.

IV. Rainfall data.

V. Details of offences detected by Madurai Mobile party in Kamarajar Division.

(b) List of offences Range-war.

VI. Revenue and Expenditure.

VII. Statement of Annual incidence of Fire.

VIII. List of buildings.

IX. List of roads.

X. List of wells.

XI. Revenue realised from grazing.

XII. Revenue realised from sale of M.F.P., units.

XIII. List of District Forest Officers.

XIV. List of Plantations.

XV. List of E.H., Plantation due for felling.

XVI. List of flora.

XVII. List of Faun.

XVIII. Rights and concession admitted in Reserved Forests.

XIX. Meterological Data.

XX. Report on field visit to Rajasthan and Madhya Pradesh on Aerial seeding.

XXI. Field inspection notes of Thiru S. Kondas, I.F.S., Chief Conservator of Forest, Madras.

XXII. Details of various species suitable for various handles as found out by the F.R.I.

XXIII. Control forms—

(a) Control book for the Teak Plantation Working Circle.

(b) Control books for the Soft-wood and pulp-wood plantation working circle.

(c) Control book for the Minor Forest Produce Working Circle.

(d) Control book for the Grazing working circle.

(e) Control forms for the Energy-wood Plantation Working Circle.

(f) Records of Works Miscellaneous.

XXIV. Register of deviations

APPENDIX I.

STATEMENT SHOWING THE EXTENT OF RESERVE FOREST IN KAMARAJAR FOREST DIVISION AS ON 31 3– 1986.

Serial number and name of the reserve forest.	*Notification (number) and date under Section 16 of Tamil Nadu Forest Act.*	*Original extent as per Section 16, Notification in hect.*	*Name of taluk and range.*	*Extent as on 31st March 1986 in hect.*
(1)	(2)	(3)	(4)	(5)
1. Srivilliputhur	1611, dated 20th December 1983.	17,416.14	Srivilliputhur	17,416.14
2. Kansapuram	383, dated 30th July 1891.	271.58	Do.	271.58
3. Unnipathimalai	175, dated 10th April 1891.	222.75	Do.	222.75
4. Valaikulamparambu	355, dated 23rd July 1891.	477.70	Rajapalayam	477.70
5. Sappaniparambu	311, dated 24th October 1887.	154.54	Do.	154.54
6. Kothankulam	214, dated 27th May 1890.	222.74	Do.	222.74
7. Kollankondan Block I.	38152/FR.III.80-5/, dated 2nd December 1980.	77.00	Do.	77.00
8. Kollankondan Block II	38151/FR III, 80-6/dated 2nd December 1980.	57.90	Do.	57.90

APPENDIX II.

STATEMENT SHOWING THE EXTENT OF RESERVE LAND IN KAMARAJAR FOREST DIVISION AS ON 31– 3– 1986.

Serial number and name of Reserve land.	*Original extent in hec.*	*Name of taluk and Range.*	*Date of taking over at R. L.*	*Whether notified under section 4 of notification number and date.*	*Authority for such transfer.*	*Extent as on 31st March 1986.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Seithur	7,624.81	Rajapalayam ..	..	G.O. 904, F. & F., dated 27th October 1978.	..	7,624.8

APPENDIX III.

LIST OF RANGES, SECTIONS AND BEATS IN KAMARAJAR FOREST DIVISION AS ON 31– 3– 1986.

Range. Name.	Range. Headquarters.	Section. Name.	Section. Headquarters.	Beats. Name.	Beats. Headquarters.
(1)	(2)	(3)	(4)	(5)	(5)
Srivilliputhur	Srivilliputhur	Kansapuram	Kansapuram.	Pilavakkal-I	Pilavakkal.
				Pilavakkal-II	Pilavakkal.
				Kansapuram-I	Kansapuram.
				Kansapuram-II	Kansapuram.
		Pudupatty	Pudupatty	Pudupatty	Pudupatty.
				Maruthadi	Pudupatty.
				Kunnur	Kunnur.
				Rengantheertham	Thottiapatti.
		Srivilliputhur	Srivilliputhur	Rengarkoil	Srivilliputhur.
				Alagarkoil	Mamsapuram.
				Viriyankoil	Mamsapuram.
				Athithondu	Mamsapuram.
Rajapalayam	Rajapalayam (Mudangiar)	Rajapalayam	Rajapalayam	Ayyanarkoil	Rajapalayam.
				Rajamparai	Rajapalayam.
				Valikulam	Mamsapuram.
		Mudangiar	Rajapalayam	Ammankoil	Rajapalayam
				Kottamalai	Pudur.
				Pulpathy	Pudur.
		Seithur	Seithur	Pravadiar	Seithur.
				Navaluthu	Devadanam.
				Deviar	Devadanam.
Wildlife	Sivakasi	Wildlife unit.	Rajapalayam	Wildlife unit.	Range headquarters shifted to Srivilliputhur as per G.O. Ms. No. 866, F. & F dated 5th September 1985.

APPENDIX IV.

RAIN FALL-DATA-KAMARAJAR DIVISION.

Rainfall in m m.

Year.	January.	February	March	April	May	June	July.	August.	September.	October.	November.	December.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Station :—Srivilliputhur.													
1976	2.6 (1)	..	17.4 (2)	40.8 (7)	88.0 (3)	22.0 (2)	28.4 (2)	59.0 (5)	29.0 (3)	68.2 (7)	412.8 (18)	49.0 (7)	817.2 (57)
1977	..	57.2 (3)	30.4 (3)	86.8 (8)	131.4 (8)	..	22.0 (4)	30.5 (3)	151.4 (9)	440.0 (20)	251.2 (16)	5.4 (1)	1,206.3 (75)
1978	..	76.0 (2)	72.6 (4)	84.6 (4)	81.8 (5)	8.4 (2)	8.0 (1)	7.8 (2)	33.4 (4)	201.0 (12)	127.6 (6)	195.8 (5)	867.0 (47)
1979	5.0 (1)	80.6 (6)	..	32.0 (2)	37.4 (4)	23.6 (5)	9.6 (2)	57.0 (3)	121.8 (8)	181.2 (10)	651.8 (25)	56.2 (4)	1,264.2 (70)
1980	..	..	8.0 (1)	151.4 (6)	87.4 (8)	3.2 (1)	..	..	96.0 (6)	114.0 (12)	188.0 (13)	150.8 (7)	795.8 (54)
1981	..	2.4 (1)	15.4 (2)	86.2 (6)	154.8 (7)	43.6 (13)	435.0 (6)	33.6 (3)	191.6 (9)	199.0 (17)	280.0 (8)	98.2 (8)	1,139.8 (78)
1982	..	3.0 (1)	..	24.9 (5)	89.9 (8)	0.4 (1)	22.3 (6)	16.6 (3)	17.4 (5)	153.9 (10)	297.4 (16)	28.0 (4)	683.8 (59)
1983	..	..	..	3.8 (1)	20.6 (7)	68.3 (3)	30.0 (2)	4.9 (1)	28.0 (5)	330.0 (11)	245.0 (9)	147.5 (8)	1,059.1 (47)
1984	50.0 (5)	204.1 (6)	550.0 (7)	153.0 (7)	61.0 (4)	20.2 (5)	17.2 (4)	24.5 (2)	466.3 (11)	268.0 (8)	161.0 (8)	10.0 (4)	1,985.3 (71)
1985	116.0 (5)	4.0 (1)	40.0 (1)	7.5 (2)	30.5 (5)	24.0 (5)	24.5 (5)	15.8 (5)	139.2 (8)	162.5 (7)	141.8 (11)	32.5 (7)	736.3 (62)

Rainfall in m m. 4

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Station :— Rajapalayam.													
1979	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	14.2 (1)	29.6 (2)	208.6 (11)	319.8 (13)	756.6 (24)	46.2 (3)	
1980	..	..	..	162.6 (5)	117.4 (5)	15.0 (1)	14.2 (2)	..	101.2 (5)	221.6 (12)	420.8 (15)	138.5 (6)	1191.2 (51)
1981	9.8 (1)	2.4 (1)	72.0 (5)	61.8 (4)	71.3 (5)	37.8 (6)	20.6 (2)	41.5 (5)	115.8 (9)	196.7 (16)	141.7 (9)	89.8 (7)	861.2 (68)
1982	.	6.7 (1)	..	72.2 (7)	73.4 (8)	..	..	..	N.A.	N.A.	N.A.	N.A.	
1983	.	..	..	1.0 (1)	87.4 (9)	12.8 (1)	11.4 (4)	7.0 (1)	15.8 (3)	223.4 (14)	153.8 (10)	102.0 (6)	616.6 (49)
1984	51.6 (5)	80.0 (10)	198.6 (7)	65.0 (9)	..	50.2 (4)	4.2 (1)	..	177.8 (8)	173.0 (6)	72.6 (7)	..	873.0 (57)
1985	56.8 (5)	57.2 (3)	14.0 (2)	38.8 (3)	7.0 (8)	36.6 (4)	8.8 (3)	2.6 (1)	107.8 (5)	133.0 (5)	193.0 (13)	20.2 (4)	675.8 (51)
Station :—Saithur.													
1978	..	36.0	9.5	98.2	99.5	..	69.6	..	53.8	203.2	118.6	84.2	772.6
	———— Number of rainy days not available. ————												
1979	.. ..	81.6 N.A.	10.0 N.A.	.. ..	38.6 N.A.	8.2 N.A.	70.0 (2)	30.0 (3)	98.0 (6)	92.4 (10)	582.0 (19)	28.0 (3)	1038.8
1980	..	..	..	82.4 (3)	35.2 (3)	..	..	..	124.6 (8)	213.0 (9)	211.8 (10)	79.2 (3)	746.2 (36)
1981	10.2 (1)	..	2.6 (1)	8.8 (2)	123.6 (7)	0.8 (1)	76.2 (5)	..	203.3 (7)	260.0 (11)	63.8 (5)	84.6 (7)	833.8 (47)
1982	..	..	6.8 (1)	63.8 (5)	64.8 (4)	14.0 (2)	6.8 (1)	..	89.8 (5)	72.6 (6)	218.2 (11)	52.3 (3)	589.1 (38)
1983	..	..	..	..	66.6 (7)	81.6 (4)	12.0 (3)	14.6 (4)	55.6 (3)	204.8 (12)	188.8 (5)	122.6 (11)	748.6 (41)
1984	35.6 (3)	108.0 (7)	118.0 (6)	11.2 (3)	10.4 (2)	3.2 (1)	20.5 (3)	40.2 (4)	82.8 (6)	100.0 (5)	108.6 (6)	1.6 (1)	644.1 (44)
1985	117.2 (4)	..	5.6 (2)	65.8 (3)	5.8 (1)	..	52.6 (5)	3.0 (1)	72.1 (5)	43.6 (4)	143.3 (12)	20.0 (2)	529.0 (39)

Rainfall in m. m.

Year.	Months.												
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
ARUPPUKOTTAI.													
1978	..	3.7	..	13.3	44.5	..	76.4	4.2	148.8	82.5	66.8	86.9	527.1
	Rainy days not available.												
1979	..	59.6	..	26.0	58.8	..	26.0 (2)	23.2 (3)	144.7 (7)	91.8 (6)	475.9 (24)	22.3 (5)	928.3
		Rainy days not available.											
1980	..	..	133.9 (7)	..	57.6 (2)	3.6 (1)	3.6 (1)	..	138.8 (7)	112.7 (9)	80.5 (6)	43.0 (3)	573.7 (36)
1981	35.3 (2)	..	1.5 (1)	23.0 (1)	..	..	110.1 (5)	56.4 (3)	167.2 (7)	..	137.8 (6)	77.8 (6)	609.1 (31)
1982	..	..	6.8 (1)	45.9 (4)	101.3 (3)	10.9 (1)	6.8 (1)	..	89.8 (5)	72.6 (6)	218.2 (11)	52.3 (3)	604.6 (35)
1983	..	..	..	..	126.5 (6)	169.2 (3)	19.8 (2)	18.7 (2)	56.8 (5)	225.5 (8)	209.4 (7)	136.0 (10)	961.9 (43)
1984	61.6 (3)	112.1 (9)	159.2 (8)	21.0 (3)	32.2 (2)	..	50.0 (2)	8.8 (3)	192.4 (8)	118.3 (8)	87.6 (6)	7.0 (1)	850.2 (53)
1985	35.0 (3)	..	9.6 (3)	51.0 (2)	27.0 (2)	21.6 (4)	29.2 (6)	106.1 (5)	31.8 (5)	33.6 (3)	35.2 (7)	32.2 (4)	412.3 (44)

Rainfall in m. m.

Year.	Months.												
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
VIRUDHUNAGAR.													
1978	..	14.2	38.2	..	49.2	..	43.4	4.0	53.4	216.0	86.4	127.6	632.4
						Rainy days not available.							
1979	..	59.0	..	..	25.0	3.0	12.0	60.0 (3)	69.5 (6)	88.7 (6)	756.6 (23)	23.8 (2)	1,097.6
		Rainy days not available.											
1980	..	..	..	231.0 (8)	29.4 (2)	..	28.0 (1)	..	151.0 (3)	228 4 (8)	101.0 (6)	92.0 (8)	860.8 (36)
1981	..	...	69.0 (2)	..	149.0 (7)	..	88.0 (4)	116.0 (3)	220.0 (9)	327.9 (9)	213.9 (9)	75.0 (7)	1,258.8 (50)
1982	..	..	..	114.5 (4)	65.6 (5)	45.6 (2)	53.5 (5)	..	219.0 (5)	94.2 (6)	219.5 (11)	37.8 (3)	849.7 (41)
1983	..	..	..	..	146.7 (7)	81.3 (4)	98.5 (4)	93.8 (6)	110.9 (9)	162.2 (7)	154.3 (6)	194.0 (7)	104.7 (50)
1984	71.0 (3)	120.0 (7)	163.0 (7)	151.0 (7)	35.0 (2)	4.0 (1)	24.0 (3)	84.0 (3)	284.0 (9)	140.6 (3)	86.5 (5)	7.6 (3)	1170.7 (53)
1985	103.2 (3)	.	25.0 (4)	52.0 (4)	8.0 (3)	8.8 (3)	44.2 (3)	52.2 (6)	98.5 (8)	160.0 (3)	118.2 (10)	27.0 (4)	697.2 (48)

Rainfall in m.m.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	Total.
	Months.												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
KARIAPATTY.													
1978	..	.:	2.0	19.3	57.1	..	16.2	2.7	60.1	37.7	53.9	74.3	323.3
	Rainy days not available.												
1979	2.9	35.7	12.0	..	4.0	34.0	16.4	12.0	9.6	37.3	204.6	11.3	379.8
	Rainy days not available.												
1980	..	..	16.2	32.4	70.9	..	..	42.6	123.7	67.1	92.2	42.2	487.3
	Rainy days not available.												
1981	..	..	..	27.6	17.1	..	84.0	22.3	188.9	246.3	82.2	64.5	732.9
	Rainy days not available.												
1982	..	..	17.5	33.3	53.9	29.5	42.6 (3)	19.1 (2)	69.4 (4)	35.4 (3)	108.3 (8)	42.8 (3)	451.8
	Rainy days not available.												
1983	..	..	..	..	59.3 (4)	29.3 (7)	38.8 (2)	90.8 (3)	70.3 (3)	82.5 (5)	100.6 (2)	120.3 (6)	591.9 (28)
1984	36.0 (4)	122.4 (10)	229.0 (7)	16.0 (2)	6.0 (1)	..	50.5 (5)	80.2 (3)	52.0 (3)	272.6 (6)	43.0 (3)	22.0 (1)	879.7 (45)
1985	93.3 (4)	..	6.0 (1)	66.0 (2)	28.0 (2)	..	49.0 (4)	121.5 (5)	54.5 (4)	32.0 (3)	151.0 (5)	18.6 (2)	619.9 (38)

Rainfall in m.m.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	Total.
	Months.												
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
KAVALUR.													
1980	..	..	14.9	115.0	36.9	..	3.9	15.4	129.5	144.2	97.6	60.6	618.0
	Rainy days not available.												
1981	..	6.4	3.1	7.0	48.4	55	74.0	36.0	115.0	285.5	229.7	72.9	883.5
	Rainy days not available.												
1982	..	..	24.1	109.0	21.2	25.0	21.5 (5)	..	137.0 N.A.	93.2 (9)	184.4 (12)	27.8 (4)	643.2
	Rainy days not available.												
1983	..	..	..	17.5 (1)	146.0 (8)	45.5 (7)	24.0 (4)	22.8 (4)	68.9 (7)	77.8 (11)	220.0 (7)	125.9 (12)	748.4 (61)
1984	37.9 (5)	109.6 (10)	120.0 (7)	115.3 (7)	10.9 (3)	3.4 (2)	9.3 (4)	43.2 (3)	109.2 (9)	62.9 (5)	76.3 (7)	13.8 (3)	811.8 (65)
1985	78.0 (1)	.. (2)	21.9 (2)	42.7 (2)	16.2 (4)	1.2 (3)	5.3 (5)	50.9 (15)	82.6 (8)	99.2 (5)	84.0 (12)	13.0 (4)	495.0 (54)

Rainfall in m.m.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
SIVAKASI.													
1978	..	22.0	6.0	37.5	21.5	..	29.0	..	37.0	60.4	106.6	115.5	455.5
	Rainy days not available.												
1979	..	160.7	6.0	4.5	..	113.8	14.5	23.3	69.7	126.0	762.4	20.8	1,301.7
	Rainy days not available.												
1980	..	..	..	55.0	76.5	..	..	..	99.5	41.5	186.3	97.8	556.6
	Rainy days not available.												
1981	..	21.5	4.5	14.0	58.4	9.2	63.7	24.8	91.0	258.5	82.5	74.0	702.1
	Rainy days not available.												
1982	..	..	..	6.5	58.5	11.0	34.5	..	46.0	78.0	172.0	41.6	448.2
	Rainy days not available.					N.A.	(2)		(5)	(5)	(15)	(2)	
1983	..	..	..	21.5	39.0	36.5	23.0	..	55.5	238.2	169.4	89.5	672.6
				(1)	(2)	(4)	(1)		(3)	(8)	(7)	(6)	(32)
1984	74.8	125.5	126.0	25.0	6.0	..	15.1	..	281.7	115.6	63.5	3.0	836.2
	(3)	(5)	(6)	(5)	(1)		(2)		(7)	(4)	(5)	(1)	(39)
1985	94.4	..	66.2	..	45.8	..	14.5	17.5	72.6	95.0	97.7	58.5	562.2
	(3)		(1)		(2)		(2)	(2)	(7)	(4)	(9)	(5)	(35)

94

Rainfall in m.m.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Thiruchzhi.													
1978	..	..	2.0	19.3	57.1	..	90.3	..	114.7	123.8	48.3	204.9	660.4
	Rainy days not available.												
1979	..	47.7	1.8	3.0	..	..	84.0	44.0	116.9	128.2	515.3	32.9	973.8
	Rainy days not available.												
1980	..	..	18.0	80.4	41.6	..	..	29.4	47.2	102.0	48.6	49.8	497.0
	Rainy days no tavailable.												
1981	12.4	..	..	9.2	76.2	..	79.6	70.5	134.6	257.7	82.8	80.6	803.6
	(1)		(2)	(2)	(5)		(8)	(5)	(8)	(12)	(7)	(6)	(54)
1982	..	..	..	105.3	103.1	..	3.2	14.4	172.6	33.8	171.8	..	594.2
				(4)	(3)		(1)	(1)	(6)	(5)	(12)		(32)
1983	..	..	..	..	59.2	54.4	14.9	74.6	18.0	114.0	87.6	106.0	528.7
					(4)	(3)	(2)	(3)	(1)	(4)	(4)	(8)	(29)
1984	23.6	84.0	222.6	61.8	43.4	..	15.0	32.6	78.3	89.8	69.0	19.0	733.1
	(2)	(6)	(7)	(2)	(2)		(1)	(4)	(7)	(5)	(3)	(2)	(41)
1985	8.6	..	..	47.2	62.0	32.6	31.4	117.8	59.8	91.0	103.2	7.8	561.4
	(1)			(3)	(4)	(2)	(4)	(5)	(6)	(2)	(7)	(2)	(36)

95

Rainfall n m.m.

Year. (1)	Jan. (2)	Feb. (3)	Mar. (4)	Apr. (5)	May. (6)	June. (7)	July. (8)	Aug. (9)	Sep. (10)	Oct. (11)	Nov. (12)	Dec. (13)	Total. (14)
Pilavakkal.													
1981	..	..	48.0	52.0	19.5	57.5	11.0	45.0	125.5	474.5	177.0	55.0	1065.0
Rainy days not available.													
1982	..	..	82.0	135.5	..	21.0	14.0 (2)	5.0 (3)	58.5 (6)	128.0 (8)	364.5 (16)	26.5 (4)	830.0
Rainy days not available.													
1983	..	..	..	2.0 (1)	55.5 (7)	63.0 (4)	10.0 (1)	5.0 (1)	36.0 (5)	220.0 (11)	260.6 (6)	124.0 (8)	794.1 (44)
1984	91.0 (8)	220.0 (6)	467.8 (4)	60.8 (4)	30.0 (1)	..	10.0 (1)	..	105.5 (13)	350.0 (5)	176.4 (7)	17.4 (2)	1528.9 (51)
1985	99.4 (7)	9.0 2)	24.0 (1)	47.9 (5)	123.6 (7)	..	32.0 (5)	22.4 (3)	129.6 (7)	229.1 (7)	129.6 (7)	2.0 (1)	84.6 (52)

Rainfall in mm.

Year. (1)	Jan. (2)	Feb. (3)	Mar. (4)	Aprl. (5)	May. (6)	June. (7)	July (8)	Aug. (9)	Sep. 10)	Oct. (11)	Nov. (12)	Dec. (13)	Total. (14)
VATHIRAIRUPPUi													
1978	..	53.0	..	45.0	..	..	..	..	91.0	334.0	93.9	217.0	833.9
Rainy days not available.													
1979	..	..	..	..	..	35.8	2.2	46.9	183.5	92.6	696.1	35.6	1092.7
1980	..	..	2.8	268.4	72.6	..	..	..	116.4	252.0	275.4	30.9	1018.5
Rainy days not available.													
1981	..	..	48.0	44.6	47.6	50.2	91.8	38.0	867.4	287.5	245.0	36.6	1756.7
Rainy days not available.													
1982	..	..	..	30.6	61.6	..	5.0 (1)	7.6 (2)	43.8 (4)	242.6 (10)	255.8 (13)	31.0 (3)	678.0
Rainy days not available.													
1983	..	..	..	39.0 (4)	72.2 (5)	63.8 (4)	22.0 (1)	6.0 (1)	23.4 (6)	161.5 (12)	153.7 (7)	170.7 (9)	712:3 (49)
1984	5.51 (7)	220.0 (12)	365.0 (5)	93.6 (6)	23.0 (1)	7.2 (1)	24.0 (3)	..	160.5 (12)	117·3 (8)	277.2 (9)	7.0 (1)	1349.9 (65)
1985	93.8 (5)	5.4 (1)	17.0 (2)	60.8 (3)	145.2 (6)	..	11.0 (2)	45.2 (5)	112.4 (8)	239.9 (9)	85.5 (6)	15.2 (2)	831.14 (48)

APPENDIX-V.

Statement showing the number of offence booked and ' C ' Fees realised in Kamarajar Forest Division.

I. By Madurai Mobile Party.

Year.	Number and nature of offences.					Total.	Total ' C ' fees collected.
	Felling.	Browsing/illicit grazing.	Sandalwood cases.	Poaching.	Miscellaneous.		RS. P.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1977—78	1	40	Nil.	Nil.	8	49	15,544 00
1978—79	..	..	..	..	..	..	..
1979—80	..	8	..	..	1	9	3,000 00
1980—81	5	10	..	..	11	26	8,815 00
1981—82	1	..	..	1	4	6	3,550 00
1982—83	7	4	..	..	5	16	3,835 00
1983—84	41	1	..	..	2	44	3,490 00
1984—85	24	4	..	..	23	48	11,020 00
1985—86	33	4	..	1(Prosecuted.)	32	1+69	43,280 00
1986-87 (upto Feb. 1987)	73	3	..	..	22	98	27,280 00

APPENDIX-V 'A'.

Particulars of offence booked and C' fees realised in Kamarajar Division.

II. Srivilliputhur Range.

Year.	Number and nature of offence.					
	Felling.	*Browsing-illicit grazing.*	*Sandal wood cases.*	*Miscellaneous.*	*Total.*	*Total 'C' fees collected.*
(1)	(2)	(3)	(4)	(5)	(6)	(7) Rs. P.
1976—77	8	391	2	17	418	12,155 00
1977—78	..	504	3	11	518	11,740 00
1978—79	7	501	6	3	517	11,055 00
1979—80	8	358	6	..	380	16,753 00
1980—81	17	267	3	10	297	19,166 00
1981—82	77	495	2	29	603	45,902 00
1982—83	13	394	2	52	451	26,100 00
1983—84	7	282	1	16	306	19,998 00
1984—85	2	256	..	4	262	31,907 00
1985—86	8	167	..	2	177	10,985 00
1986—87	6	398	..	7	441	34,340 00

APPENDIX V-'B'.

STATEMENT SHOWING THE NUMBER OF OFFENCE BOOKED AND 'C' FEES REALISED IN KAMARAJAR FOREST DIVISION.

III. RAJAPALAYAM RANGE.

Year.	Number and nature of offence.					Total 'C' fees collected,
	Felling.	*Browzing illicit grazing.*	*Sandalwood cases.*	*Miscellaneous.*	*Total.*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
						RS. P.
1977–78	Rajapalayam Range formed in September 1979.					
1978–79	242	11	..	6+1	259+1	9,521.00
1979–80	285	4	1	24	314	11,457.00
1980–81	538	17	..	61	616	25,027.00
1981–82	376	5	..	38	419	21,625.0
1982–83	241	..	..	7	248	17,005.00
1983–84	375	7	..	14	396	33,565.00
1984–85	474	4	2	15	495	52,410.00
1985–86	514	4	..	25	543	52,720.00
1986–87 .. .. (up to February 1987.)						

APPENDIX VI.

STATEMENT SHOWING REVENUE AND EXPENDITURE OF THE KAMARAJAR FOREST DIVISION.

Serial number.	*Year.*	*Revenue.*	*Expenditure (in rupees).*	*Surplus.*	*Deficit.*
(1)	(2)	(3)	(4)	(5)	(6)
1	1976–77	36,127.90	50,301.37	..	14,173.46
2	1977–78	N.A.	N.A.	..	..
3	1978–79	2,04,694.43	2,04,694.43	..	..
4	1979–80	49,350.45	1,07,922.74	..	58,572.29
5	1980–81	5,53,647.76	5,59,917.46	..	6,267.70
6	1981–82	10,08,541.80	10,08,541.80	..	..
7	1982–83	10,62,856.95	10,13,853.90	..	39,003.05
8	1983–84	N.A.	N.A.	..	..
9	1984–85	N.A.	N.A.	..	..
10	1985–86	N.A.	N.A.	..	..
11	1986–87	15,79,891.10	18,32,163.34	..	2,52,872.84

N.A.=Not available.

APPENDIX VII.

STATEMENT OF ANNUAL INCIDENCES OF FIRES.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November	December.	Annual total.	Total area burnt in hec.	Loss value in Rs.
							Months.								
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1974 ..	..	..	..	..	..	..	..	1(R)	..	..	..	1(R)	..	2 2.5 Ac.	..
1975 ..	..	..	..	..	1(R)	2(R)	..	..	..	..	..	..	..	3 16.00 Ac.	..
1976 ..	..	..	..	3(R)	..	..	..	..	..	..	..	..	..	4 10.00 Ac.	600.00
1977 ..	..	..	..	1(S)	..	1(R)	1(R)	..	..	..	..	..	..	2 7.29	..
1978 ..	..	..	..	..	1 R)	..	..	..	..	..	..	..	..	1 9.00	..
1979 ..	..	..	..	..	..	..	..	..	..	..	..	..	..	.. ..	..
1980 ..	..	..	..	..	..	..	..	..	..	..	..	..	..	.. ..	..
1981 ..	..	..	..	..	..	..	..	..	..	..	..	..	..	.. ..	..
1982 ..	..	..	..	..	..	..	..	..	..	..	..	..	..	.. ..	..
1983 ..	..	..	..	..	..	..	..	..	..	..	..	..	..	.. ..	..
1984 ..	..	..	..	..	..	1(S)	1(S)	1(S)	..	..	..	..	..	3 19.50	..
1985 ..	..	..	..	..	..	1(R)	2(R)	1 (R)	..	..	..	..	..	4 16.39	..

(R) Rajapalayam. (S) Srivilliputhur.

APPENDIX VII-A.

ABSTRACT.

ANNUAL INCIDENCE OF FIRE IN KAMARAJAR DIVISION.

Serial number.	*Year of occurance.*	*Annual total.*	*Total area burnt in hectares.*	*Value of loss in Rs.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)	(6)
1	1974	2	2.5 Ac.	..	..
2	1975	3	16.00	600.00	..
3	1976	4	100.00 ha.	..	..
4	1977	2	7.29 ha.	..	..
5	1978	1	9.00 ha.	..	..
6	1979	..	..	..	..
7	1980	..	..	..	..
8	1981	..	..	..	..
9	1982	..	..	..	..
10	1983	..	..	..	..
11	1984	3	19.50 ha.	..	..
12	1985	4	16.39 ha.	..	..

APPENDIX VIII.

LIST OF BUILDINGS (BOTH RESIDENTIAL AND NON-RESIDENTIAL) IN KAMARAJAR DIVISION AS ON 31—3—1986.

Serial number	*Name of the buildingand place*	*Constructed by Forest department or acquire*	*Year of construc-tions.*	*Cost of construc-tion.*	*Capital cost as on 31st March 1986.*	*Cost of land.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				RS. P.	RS. P.		
	Srivillputhur Range.						
B1	Range Officer's Ousrters at Srivilliputhur.	Constructed by	1911	4,413.50	9,220.55	Department land	
B2	Sub-line at Pudupatty	Do.	1912	1,046.00	11,482.16	Do.	
B3	Forester's quarters at Pudupatti	Do.	1929	1,307.00	6,261.37	Do.	
B4	Range Office Building at Srivilliputhur.	Do.	1911	2,540.00	28,443.52	Do.	
B5	Rest House at Pudupatty, ..	Do.	1896	2,050.00	17,302.46	Do.	
B6	Rest House at Mudaliaruthu.	Do.	1897	2,035.00	6,000.43	Do.	
B7	Forest Guard's quarters at Kansapuram.	Do.	1958	2,922.31	4,567.11	Do.	
B8	Forest Guard's Quarters at Melachampatti.	Do.	1959	2,952.39	5,609.30	Do.	
B9	Combind Subordinate quarters at Srivilliputhur,	Do.	1960	5,359.00	10,526.50	Do.	
B10	Sandalwood store shed at Srivilliputhur.	Do.	1965	5,593.58	6,492.40	Do.	
B11	Forest's Quarters at Srivilliputhur.	Do.	1968	7,971.05	10,239.52	Do.	
B12	Tractor shed at Srivilliputhur.	Do.	1980	18,482.15	18,711.65	Do.	
	Rajapalayam.						
B13	Forest Quarters at Mudangiar ..	Do.	1945	3,248.00	5,217.70	Do.	
B14	Sub-Line at Mudangiar. ..	Do.	1945	4,475.00	6,444.70	Do.	
B15	Sub-Line at Pudur of Kottamaai Beat.	Do.	1961	5,994.00	16,816.26	Do.	
B16	Sub-Line at Pulpathi Beat. ..	Do.	1961	6,420.81	16,108.66	Do.	
B17	Sub-Line at Devathanam	Do.	1965	6,155.42	11,894.27	Do.	
B18	Store-*cum*-watchman shed at Mudangiar.	Do.	1982	28,338.00	28,741.00	Do.	
B19	Pump room at Mudangiar. ..	Do.	1983	8,233.00	9,100.75		
B20	Rest House at Mudangiar. ..	Do.	1896	600.40	6,152.16	Do	

APPENDIX IX.

LIST OF ROADS IN KAMARAJAR FOREST DIVISION AS ON 31—3—1986.

Serial number	Ref. No. on map.	Name of Road.	Nature of road i.e., ear thern metalled or black topped etc.,	Formed by Forest Depart-ment or acqui-red.	Cost of formation.	Year of formation.	Capital cost as on 31st March 1986.	Length and Width of Road. Length.	Width.	Other details. if any.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Srivilliputhur Range.—										
1	R1	Thalamalayar-Pulihuthu-virusadi bridle path.	Earthern road.	Formed by Forest depart-ment.	1,650	1893	4,698.82	6m 1 f	4' 6"	..
2	R2	Athithundu-Puliuthu bridle path.	Do.	Do.	500	1894	588.00	4M 2f	4' 6"	..
3	R3	Virusadi Mudaliyar yuthn Bridle path.	Do.	Do.	500	1897	13,44.00	IM 4F	4' 6"	..
4	R4	Mudaliyaruthu-Chittar Bridle path.	Do.	Do.	995	1905	5,059.36	6M 4f	4' 6"	..
5	R5	Ayyanarkoil-Papparai	Do.	Do.	3,624	1893	3,624.00	7M 1F	4' 6"	..
6	R6	Chittar-Vairavansolai ..	Do.	Do.	1,815	1910	1,815.00	8M	4' 6"	..
7	R7	Gandamanaickanuir path	Do.	Do.	370	1913	406.00	4M	4' 6"	..
8	R8	Cart-track in old coupes VII and VIII in Ayya-nar koil.	Do.	Do.	609.00	1926-27	609.00	1M 3F	12' 6"	..
9	R9	Cart track in coupe IX	Do.	Do.	466	Do.	466.00	3F	12' 0"	..
10	R10	Cart tract in coupe XI	Do.	Do.	266	1929-30	266.00	5F	12' 0"	..
11	R11	Cart track in coupe X ..	Do.	Do.	571	1928-29	571.00	5F	12' 0"	..
12	R12	Chakkarathlavar to Hand past Bridle path.	Metal	Do.	31,700	1979-80	31700.00	1 Km.	..	..
Rajapalayam Range.—										
13	R13	Inspection path in Nava-luthu beat.	Mud road	Do.	1,057.50	1980-81	1057.50	0.5 Km.	..	..

APPENDIX—X

LIST OF WELLS IN KAMARAJAR FOREST DIVISION AS ON 31—3—1986.

Serial. number.	*Reference Number in the map.*	*Name of place (Range wise.)*	*Constructed or acquired.*	*Capital cost.*	*Year of construction.*	*Depth and dia of well.* Deprh	Dia.	*Remarks.*
			I. SRIVILLIPUTHUR RANGE:					
1	W1	Athithondu	Constructed.	90.00	1894	8½ ft.	11'	
2	W2	Pudupatty	Do.	1,434.50	1896	, 20ft	11¼ ft.	
3	W3	Sriavilliputhur .. .. Rnge compound.	Do.	473.50	1911	6'0"	..	
II. RAJAPALAYAM RANGE :								
4	W4	Mundangiar	Do.	3613.00	1896	5'0"	13½ ft.	
5	W5	Pudur	Do.	5994.00	1961	6'0"	5' 0"	
6	W6	Dorasamy puram ..	Do.	9010.00	1981	..	..	

APPENDIX XI

STATEMENT SHOWING THE REVENUE REALISED FROM GRAZING IN KAMARAJAR FOREST DIVISION FROM 1977—1978 TO 1986—1987.

(RANGEWISE AND YEARWISE.)

Name of the Range,	1977—78	1978—79	1979—80	1980—81	1981—82	1982—83	1983—84	1984—85	1985—86	1986—87
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Srivilliputhur ..	12,847	16,039	11,759	9,719	16,014	11,036	9,820	9,005.00	10,022	7,430 (Upto February 1987)
Rajapalayam Range formed in September 1979.	..	..	5,480	11,620	7,641	7,592	6,545	9,602	10,002	10,3 8 (Upto February 1987)

APPENDIX XII

STATEMENT SHOWING REVENUE REALISED FOR M.F.P. LEASE IN KAMARAJAR FOREST DIVISION FROM 1977—1978 TO 1986—1987.

(RANGEWISE AND YEARWISE).

Name of Range.	1977—78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Srivilliputhur ..	24,781	29,607	15,807.20	21,664	14,352	4,875	6,107	12,396.35	10,330.80	8,057.00
Rajapalayam ..	..	..	43,975.50	31,592	17,597	28,867	N.A.	64,945	33,785	19,297.80

N.A.—Not available.

APPENDIX XIII.

LIST OF DISTRICT FOREST OFFICERS OF THE KAMARAJAR DIVISION

Serial number.	*Name of Officer.*	*From.*	*To.*
(1)	(2)	(3)	(4)
Thiruvalargal			
1	M.S.Karunakaran, I.F.S., ...	16– 3– 1975.	4– 1—1987AN
2	J. Wilson, I.F.S., ...	5– 1—1978 F.N	24—4— 1979
3	Y. S. Kadachamani I.F.S., (Addl.)	25– 4– 1969	9– 5– 1979
4	K. Gopalakrishnan, I.F.S., ...	10– 5—1979	6—8– 1980
5	K. Marimuthu	7– 8– 1980	23– 6– 1982 A.N.
6	N. Koildhasan (Addl. charge)	23– 6– 1982 A.N.	....
7	A. Balasundaram	24– 6– 1982 F.N.	23– 7– 1983 A.N.
8	S. Balu	24—7– 1983	3– 9– 1984 A.N
9	S. Sachidananda Jha, I.F.S., ...	4—9—1984	12– 4– 1985
10	A. Thamburaj (Addl charge)	13– 4– 1985 F.N.	19– 5– 1985 A.N.
11	S. Sachidananda Jha, I.F.S., ...	20– 5– 1985 F.N.	13– 9– 1985 A.N.
12	A. Thamburaj, (Addl. charge)	14– 9– 1985 F.N.	16– 3– 1986 A.N.
13	T. M. Appavoo	17– 3– 1986	26– 9– 1986 AN
14	S. Balu	27– 9—1986	Till date.

APPENDIX XIV

LIST OF PLANTATIONS.

(1) SRIVILLIPUTHUR RANGE.

Serial number. (1)		*Name of the plantation* (2)	*Area in Ha.* (3)	*Species.* (4)	*Remarks.* (5)
1	1934	Ayyanarkoil	6.07	Teak	Failure
2	1935	Do.	6.27	Do.	Failure.
3	1936	Do.	5.67	Do.	Failure.
4	1938	Do.	12.14	Do.	Failure.
5	1939	Do.	12.14	Do.	Failure.
6	1940	Do.	8.42	Do.	Failure.
7	1941	Do.	10.11	Do.	Failure
8	1942	Do.	12.14	Do.	Failure.
9	1942	Do.	10.11	Do.	Failure.
10	1964	Kunnur	4.85	E.H.	Failure
11	1970	Rengartheertham	4.00	Odai	..
12	1973	Kunnur	2.02	Tam	Failure.
13	1974	Do.	10.27	Do.	Failure.
14	1974	Pilavakkal	4.00	Beedi leaf	Failure.
15	1974	Do.	83.00	E.H.	1984 E.H. replanted.
16	1974–75	Khansapuram	55.30	E.H.	..
17	1975	Pilavakkal	51.22	E.H.	1984 E.H. replanted.
18	1976	Kunnur	2.00	Tam	Failure.
19	1975—76	Khansapuram	37.2	E.H.	..
20	1976	Kunnur	5.00	Tam	..
21	1977	Kunnur	5.00	Tam	Replanted in 1969 Odai 6.06 Ha.
22	1978	Rengartheertham	85.00	Velvel	..
23	1979	Do.	50.00	Do.	..
24	1979	Do.	26.00	Odai.	..
25	1979	Kunnai	30.00	Odai.	..
26	1980	Rengarkoil	50.00	Do.	1970 Ros. 8.00 failure.
27	1980	Rengartheertham	50.00	Do.	..
28	1980	Do.	20.00	Tam	Replanted in 1969 Tam.
29	1980	Rengarkoil	30.00	Odai.	..
30	1981	Rengartheertham	29.10	Do.	..
31	1981	Rengartheertham	21.00	Do.	..
32	1981	Rengarkoil	30.00	Do.	..

Serial number.	*Year and Name of Plantation.*		*Area in Ha.*	*Species.*	*Remarks*
(1)	(2)		(3)	(4)	
33	1982	Kunnur	35.00	Odai and Parambai.	
34	1983	Pilavakkal	28.95	Misc.	..
35	1983	Khansapuram	10.00	Tam	..
36	1983	Maruthadi	4.00	Tam	..
37	1983	Pilavakkal	28.95	Misc.,	..
38	1984	Maruthadi	10.00	Tam	..
39	1984	Kunnur	12.00	Odai	..
40	1985	Pilavakkal Bit—I	33.70	Misc.,	..
41	1985	Pilavakkal	26.70	Misc.	..
		(2) RAJAPALAYAM RANGE.			
1	1956	Deviar	20.23	Teak	..
2	1956	Solai oeri	20.23	Do.	..
3	1956	Pulparthi	20.23	Do.	..
4	1957	Solaseri	20.23	Do.	..
5	1957	Pulparthi	20.23	Do.	..
6	1957	Deviar	20.63	Do.	..
7	1958	Solaiseri	19.83	Do.	..
8	1958	Pulparthy	19.83	Do.	..
9	1958	Pravadiar	8.00	Tam	Failure.
10	1958	Pravadiar	17.87	M.W.	..
11	1958	Deviar	20.23	Teak	..
12	1959	Solaiseri	15.76	Teak	..
13	1959	Deviar	20.23	Do.	..
14	1959	Pulparthi	15.76	Do.	..
15	1959	Pravadiyar	17.80	M.W.	..
16	1959	Solaseri	15.76	Teak	..
17	1960	Deviar	22.66	Teak	..
18	1960	Solaiseri	21.85	Do.	..
19	1960	Pulparthy	21.85	Do.	..
20	1960	Pravadiyar	32.37	M.W.	..
21	1961	Deviar	21.04	Teak	..
22	1961	Paravadiyar	30.75	M.W.	..
23	1961	Pulparthy	4.04	Tam	Failure.
24	1962	Navaloothu	19.42	Tam	
25	1962	Do.	19.42	M.W.	..
26	1962	Paravadiyar	30.35	M.W.	..
27	1962	Pulparthu	33.60	E.H.	..
28	1962	Do.	4.00	Tam	Failure.
29	1962	Seithur	4.00	Do	

Serial number.	*Year and name of Plantation.*		*Area in ha.*	*Species.*	*Remarks.*
(1)	(2)		(3)	(4)	(5)
30	1963	Deviar	10.00	Tam.	..
31	1963	Navaloothu	21.04	M.W.	..
32	1963	Paravadiyar	45.32	Do.	..
33	1963	Pulparthy	8.00	E.H.	..
34	1963	Do.	4.00	Tam	
35	1963	Seithur	4.00	Tam	..
36	1964	Navaloothu	40.35	M.W.	..
37	1964	Pulparthy	20.20	E.H.	..
38	1964	Pulparthy	4.04	Tam	Failure.
39	1965	Navaloothu	30.35	M.W.	..
40	1965	Pulparthy	10.10	E.H.	..
41	1965	Do.	4.00	Tam	Failure.
42	1966	Navaloothu	30.56	M.W.	..
43	1966	Deviar	10.00	Tam	Failure.
44	1966	Pulparthy-I	10.00	Tam	Failure.
45	1966	Deviar	20.24	M.W.	..
46	1966	Pulparthy	4.05	Tam	Failure.
47	1967	Navaloothu	32.78	M.W.	..
48	1967	Pulparthy	10.12	E.H.	..
49	1967	Do.	2.02	Tam	Failure.
50	1968	Navaloothu	30.75	M.W.	..
51	1968	Pulparthy	20.24	E.H.	..
52	1968	Do.	10.12	Tam	..
53	1969	Navaloothu	30.60	M.W.	..
54	1969	Pulparthy	31.51	E.H.	..
55	1969	Pulparthy	4.00	Tam	..
56	1969	Navaloothu	30.60	M.W.	..
57	1970	Pulparthy	4.00	Tam	..
58	1972	Navaloothu	57.50	Tam	Failure.
59	1972	Deviar	21.00	M.W.	..
60	1972	Paravadiar	34.30	Tam	Failure.
61	1972	Deviar	21.00	Tam	Failure.
62	1972	Deviar	21.00	R. S.	Failure.
63	1973	Do.	5.00	Do.	Failure.
64	1974	Do.	40.00	E.H.	..
65	1973	Navaloothu	50.00	Tam	Failure.
66	1974	Paravadiar	63.70	Do.	Failure
67	1975	Navaloothu	50.00	Do.	Failure.
68	1979	Seithur	15.90	Tam	..
69	1979	Pulparthy	15.00	Do.	Failure.

Serial number.	*Year and namr of plantation.*		*Area in ha.*	*Species.*	*Remarks.*
(1)	(2)		(3)	(4)	(5)
70	1980	Seithur	12.00	Tam	Failure.
71	1980	Pulparthy	15.00	Do.	Failure.
72	1981	Deviar	21.80	Do.	Failure.
73	1982	Pulparthy	17.30	Do.	Failure
74	1983	Do.	10.00	Do.	Failure.
75	1984	Sappaniparambu	7.00	Do.	Failure.
76	1985	Paravadiar	19.00	Do.	Failure.

APPENDIX IV.

The following E.H. plantation are due for felling as shown in the following table below :—

Serial number.	*Year.*	*Name of Plantation.*	*Area to be felled.*	*Felling due in.*	*Remarks.*
(1)	(2)	(3)	(4)	(5)	(6)
1.	1982 ..	Pilavakkal ..	10.00	1990	First Rotation.
2.	1976/84 ..	Do. ..	10.30	1992	Second Rotation.
3.	1974/84 ..	Do. ..	83.00	1992	Do.
4.	1975/84 ..	Do. ..	51.22	1992	Do.
5.	1975/ ..	Do. ..	37.2	1988	First Rotation *
6.	1974/ ..	Do. ..	55.3	1988	Do. *

NOTE : * From the record it is clear these plantations are not yet felled.

APPENDIX XVI.

LIST OF FLORA IN KAMARAJAR FOREST DIVISION.

Serial number.	*Name of the Plant.*	*Family name.*	*Tamil name.*
(1)	(2)	(3)	(4)
1	Abrus Precateryus L	Fabaceae (Leguminosae)	Kundumani.
2	Acacia Nilotica	Mimosoideae	Karuvai.
3	Acacia Torta (Roxb)	Do. ..	Indu.
4	Acacia Sinuta	Do. ..	Siyakayi.
5	Acacia ferruginea DC	Do. ..	Parambai.
6	Acacia leucopholoea (Roxb) Willd	Do. ..	Velvelam
7	Acacia latronum Willd	Do. ..	Kakkaodai.
8	Acacia planifrons WA	Do. ..	Odai.
9	Acacia Chundra (Roxb) Willd	Do. ..	Karunkali.
10	Acrocarpus fraxinifolius Wt	Seasalpinioideae	Malankonnai.
11	Adhathoda zeylanica Medic	Acanthaeeae	Adathodai.
12	Adaina cordifolia (Roxb) Bran	Rubiaccae	Manjakadambai.
13	Aegil marmels (L) (Corr)	Rutaceae	Vilvum.
14	Agave americana L	Agavaceae	Kathalai.
15	Aglaiaselcae gnoidea (Juss)	Mellaceae	Vegulachokla.
16	Agrostistachys meeboldii Pax. et. Hoffm. ..	Euphorbiaceae	Manikuliki
17	Ailanthus excelsa (Roxb)	Simaroubacea	Pinari.

Serial number.	Name of Plant.	Family name.	Tamil name.
(1)	(2)	(3)	(4)
18	Alangium salvifolium Wang	Alangiaceae	Alingi.
19	Albizzia amara (Roxb)	Mimosoibeae	Usil.
20	Albizia lebbeck Wild	Mimosoideae	Vagai
21	Albizia odoratissima (d.f) Benth	Do. ..	Karuvagai.
22	Alstonia scholaris R. Br	Appcynaceae	Elalaipalai.
23	Anacardium occidenteae	Anacardiacea	Mundiri.
24	Anogeissus latifolia Wall	Combretaceae	Vekkali.
25	Annona squamosa L.	Anonaceae	Seethapazham
26	Artocarpus Hirsutus Lam L	Moraceae	Ainipila.
27	Artocarpus heterophyllus Lam	Do. ..	Pila.
28	Arengavightii griff	Aracaceae (Palmaca) ..	Alampanai.
29	Atalantia monophiylla (Roxb) Dc	Rutaceae	Kattu Elimichai.
30	Atylosia trinereia Gam	Fabaceae (Leguminosae) ..	Kattuthuvarai.
31	Azadirachta indica A.Juss	Meliaceae	Vembu.
32	Bauhinia racemosa Lamk	Caesalpinioibeae	Athi.
33	Bauhinia purpurea L	Do. ..	Mantharai.
34	Bischofia javanica Bl.	Euphorbiaceae	Milachadayan
35	Borasses flbellifer L	Palmaceae	Panai.
36	Bridelia grenulata (Roxb)	Euphorbiaeae	Mulvengai.
37	Buchannaia lanzan spreng	Anacardiaecea	Saraiparuppu.
38.	Butca monosperma	Fabaceae (Leguminosae) ..	Elaiparasu.
39	Caesalpenia mimosoides (lank)	Caesalpinioideae	Pulinegakonnai.
40	Caesalpenia crista L	Do. ..	Kalachikai.
41	Calotropts tigantea (L)	Asclepiadaceae	Erukku.
42	Canthium dicoccum	Rubiaceae	Nekkini.
43	Canarium strictum (Roxb)	Burseraceae	Karungulium.
44	Capparis brevispinia DC	Capparaceae	Adondai.
45	Carallia brachiatia (Lour)	Rhizophoraceae	Varanga (Malayalam).
46	Careya arborea (Roxb)	Lecythidaceae	Ayma
47	Carissa carandas (L)	Apocynaceae	Kilakai.
48	Caryota urens	Arecaceae (Palmaceae)	Kunthapanai.

Serial number.	*Name of plant.*	*Family name.*	*Tamil Name.*
(1)	(2)	(3)	(4)
49	Cassia auriculata (L)	Caesalpinioideae	Avaram.
50	Cassia fistula (L)	Do.	Konnai.
51	Cassia siamta (Lam)	Do.	Ponavarai.
52	Cassia montana Heyne EX Roth	Do.	Malaiavaram.
53	Cassia tora (L)	Do.	Thagarai.
54	Casuarina equisetifolia	Casuarinaceae	Chovuku.
55	Celestrus paniculatus (Willd)	Celestraceae	Manjakadi.
56	Chloroxylon Swietenia (DC)	Rutaceae	Porasu.
57	Chuckrasia tabularis (A. Juss)	Melliaceae	Madagirivembu.
58	Cinnamomum Zeylanicum (Blum)	Lauraceae	Lavangam.
59	Cipadecessa Baccifari (Roth)	Mediaceae	Savutuchedy.
60	Cissus quadrangularis (L)	Vitaceae	Perandai.
61	Cleistanthus Collinus (Benth).	Euphorbiaceae	Oduvan.
62	Clitoria ternates L	Fabaceae	Kakkattan.
63	Clerodendrum viscosum (Vent)	Verbenaceae	Vattakkanni.
64	Cochlospermum Religiosum (L)	Bixaceae	Thongu.
65	Combretum ovalifolium (Roxb)	Combretaceae	Odangudi.
66	Commiphura coudata (W & A)	Burseraceae	Kiluvai
67	Crataeva nurvela (ham)	Capparaceae	Mavilingam.
68	Cocosnucifera L	Arecaceae	Thennai.
69	Cordia dometica (Roth)	Boraginaceae	Virusham.
70	Cullenia rosayoana (Kosterm)	Malvaceae	Vedipala
71	Curucema auromatica L	Zindideraceae	Kasthuri Manjal.
72	Dulbergia latifolia Roxb	Fambaceae (Leguminsoae)	Itti.
73	Dalbergia paniculata	Do.	Porapatchali.
74	Dalbergia Sissoides (Grah)	Do.	Thodagatti.
75	Dalbergia Sympathetica	Do.	Viruvetti.
76	Delonix Elata (L)	Caesalpinioideae	Vadhanarayanan.
77.	Delonix Regia (HK) Raf	Do.	Mayiljonnai.
78	Derris scandenis Benth	Fambaceae	Anaikallikodi.
79	Dichrostachys cinera W & A	Mimosoideae	Vadadhalai.

Serial number.	*Name of plant.*	*Family name.*	*Tamil name.*
(1)	(2)	(3)	(4)
80	Dillenia Pentagyna Roxb	Billeniaceae	Naytheku.
81	Diospyrox buxifolia Blume	Ebenaceae	Chinnathuvarai.
82	Diospryos montana Roxb	Do.	Vakkanai.
83	Dodonaea viscosa N. Jacq	Sapindaceae	Virali.
84	Dolichandrone atrovirens (rotb) Sprag	Bignoniaceae	Pumpadri.
85	Cassing glauca (rottb) Kurtze	Celestraceae	Kanniramaram.
86	Elettarax cardamomum mat	Zingiberaceae	Elakai.
87	Emblica officinalis	Euphorbiaceae	Nelli.
88	Entada pursaetha DC	Mimocoeideae	Irikki.
89	Erythrina suberosa roxb	Fabaceae	Mulmurukku
90	Erythrina variegata L	Do.	Mulmurankai.
91	Erythroxylon monogynum Roxb	Elaeocartaceae	Sembulichan.
92	Eucalyptus terticornis	Myrtaceae	Thailamaram.
93	Euborbia antiquorum L	Euphorbiaceae	Kalli.
94	Eubhorbia tortilis Rottl	Do.	Thirugukalli.
95	Evodia lunuankenda (Gaertn)	Rutaceae	Kattuchembagam.
96	Feronia limonia (L)	Rutaceae	Vilamaram.
97	Ficus benghalensis (L)	Moraceae	Alamaram.
98	Ficus hispida (L). f	Do.	Pei-Athi.
99	Ficus racemosa L	Do.	Athi.
100	Ficus religiosa L	Do.	Arasu.
101	Filicium decipiens	Sapindaceceae	Athtadali.
102	Flacourtia indica (burm) merr.	Bixaceae	Kattukala.
103	Maghania chapper ham	Fabaceae	....
104	Sacurinega leucopyrus (Willd)	Euphobeaceae	Veppula.
105	Gardenia turgida roxb	Rubiaceae	Malangarai.
106	Gardemia gummifera (L)	Do.	Kambili.
107	Givotia rottleriformis griff	Euphorbreacea	Kottaithanaku.
108	Glycosmic arborea (roxb) DC	Rutaceae	Kulapanai.
109	Gmelina arborea (Roxb)	Verbenaceae	Kumizh.
110	Gmelia asiatica L	Do.	Mulkumizh.
111	Gordonia obtusa	Theaceae (Ternstroemiaceae)	Mylai.

Serial number.	Name of plants.	Family name.	Tamil names.
(1)	(2)	(3)	(4)
112	Grewia disperma	Tiliaceae	Anaikattimaram.
113	Grewia tilifolia	Do.	Thadachi.
114	Gyrocarpus jacquinii	Hernandaceae	Thanaku.
115	Hardwickia binata (roxb)	Ceaesalpinioideae	Achan.
116	Helicteresisora L	Sterculiaceae	Valampuri.
117	Drypetes sepiara (W & A)	Euphorbiaceae	Veliilumbu.
118	Hemidesmus indicus R.Br	Asclepiadaecae	Nannari.
119	Naringi crenulata (Roxb) or Alalantia monophylla (Roxb) DC	Ruteaceae	Kattu elumichai.
120	Holarrhene antidysentrica (roth) DC	Apocynaceae	Erukalai parai.
121	Haloptelea integrifolia (roxb)	Ulmaceae	Ayilli.
122	Hopeaparvi flora (bedd)	Dipterocartaceae	Kongu.
123	Hugonia mystax (L)	linaceae	Mothirakodi.
124	Hydnocearpus laurifolia	bigaceae	Maravetti.
125	Indigofera aspalathoides Vahl	Fabaceae	Sevenalvembu.
126	Ixora arobora (Roxb)	Rubaceae	Sulundu.
127	Jatropha curcas (L)	Euphorbiaceae	Kattamanakku.
128	Jatropha glandulipera (Roxb)	Do.	Adalai.
129	Kingiotendron pinnatum (DC)	Caesalpinoideae	Kolavu.
130	Lannea coromandelica	Anacardiaceae	Othiamaram.
131	Lantana camara	Verbenaceae	Puchedi.
132	Laportea crenulata (Gand)	Urticeacea	Ottapila.
133	Dendrophthoe falcata (L. f)	Loranthaceae	Pulluvruvi.
134	Diospyros buxifolia (Bl)	Ebenaceae	Irumbali.
135	Macaranga peltata (roxb)	Euphorbiaceae	Vattakonnai.
136	Madhuca indica (Gmel)	Sapotaceae	Illuppai.
137	Madhuca longifolia	Do.	Nattu illuppai.
138	Mallotus philippensis, (lam)	Euphorbiaceae	Kamala.
139	Mangigifera indica, (linn)	Annocardaceae	Mamaram.
140	Melia azadarach L	Meliaceae	Malaivembu.
141	Memecylom umbellatum,	Melastomataceae	Kasan.
142	Mesuaferrea linn	Guttiferae	Nangu.

Serial number.	Name of plant.	Family name.	Tamil name.
(1)	(2)	(3)	(4)
143	Manilkara hexandra (roxb)	Sapotaceae	Palai.
144	Mitragyna parvi flora, Korth	Rubeaceae	Neerkadambu.
145	Morinda citrifolia L	Do.	Nona.
146	Moringa Olefera, lank	Morincaceae	Murungai.
147	Mundulea sericeae (Willd)	Fabaceae	Pullavaram.
148	Murraya paniculata (L)	Ruteaceae	Kattukaruveppilai.
149	Murraya koenigi (L)	Do.	Karuveppilai.
150	Musaparadisiaca, (L)	Musaceae	Valai.
151	Euphoria longan, (Lour)	Sapindaceae	Kattupuvan.
152	Opuntia dillenii, (K.G.)	Cactaceae	Nagathali.
153	Palaquium ellipti -*cum*-(dalz) Engl	Sapoteaceae	Palvadinjan.
154	Pandanus tectorius Barkinson	Pandanaecea	Thalai.
155	Parkinsonia acqleatea, L	Saesalpinioideae	....
156	Pavatta indica L	Rubeaceae	Pavattai.
157	Pavonia zeylanica (L)	Malvaceae	Sithamutte.
158	Peltophorus pterocarpus Backer	Caesalpinioideae	Iyalnagai.
159	Mackenziea integrifelia (Dalz) Bren	Acanthaceae	Kurinji.
160	Phoenix acaulis Buch	Arecaceae (Palmaceae)	Ichampul.
161	Phoenix sylvestris (L) Roxb	Do.	Icham.
162	Pinanga dicksonii (Roxb)	Do.	Kanagamugu.
163	Dithecellobium dulce (Roxb)	Mimosoideae	Kodukapuli.
164	Samaneasaman (Jackq)	Do.	Thurgumurchi.
165	Polyalthia coffeoides Hk. f and Th	Anonaceae	Nedunarai.
166	Polyaltjia longifolia Hook	Do.	Netulingam.
167	premha tomentosa Wild	Verbenaceae	Kalakattai thekku.
168	Prosopis juliflora	Mimosoideae	Velikaruvai.
169	Pterocarpus marsupim Roxb	Fabaceae (Leguminosae)	Vengai.
170	Pterolobium hexapetalum (Roth)	Caesalpinioideae	Indu.
171	Salamalia malabaraica (D.C)	Bombacaceae	Elavamaram.
172	Santalum album L	Santalaceae	Sandhanam.
173	Sapindus emarginata Vahl	Sapindaceae	Bunthikottai.
174	Schileichera oleosa (Lour) Oken	Do.	Puvan.

175	Semecarpus anacardium L.f...	Anacardiaceae	Shenkottai.
176	Sloamum pubescens wild	Solanaceae	Sind.
177	Sterculia urens Roxb	Sterculiaceae	Senthauku.
178	Sterculia villosa Roxb	Do.	Vakkainai.
179	Sterecspermum personatum (Hassk)	Bignoniaceae	Ponpadri.
180	Sterospermum suaveolens DC	Do.	Padri.
181	Strebhus asper Lour	Moraceae	Pira.
182	Strychnos nux vonica L	Loganiaceae	Etti.
183	Syzygium cumni (L)	Myrtaceae	Naval.
184	Tamarindus indica L	Caesalpinioideae	Puliamaram.
185	Tectona grandis L.f.	Verbenaceae	Thekku.
186	Terminalia arjuna W.F.A.	W. Combretaceae	Nirmaddi.
187	Termilania bellerica Roxb	Do.	Thani.
188	Terminalia Chebula	Do.	Kadukkai.
189	Thespesia populnea (L)	Malvaceae	Puvarasu.
190	Toddalia asiatica (L)	Rutaceae	Kattumilagu.
191	Vateria indica L	Dipterocarpaceae	Vellaikundrikam.
192	Vantilago madraspatana	Rhamnaceae	Vembadam.
193	Vitex atlissima L.f.	Verbenaceae	Mayiladi.
194	Vitex negundi L	Do.	Nochi.
195	Wrightia tinctoria R. Br.	Apocynaceae	Palai.
196	Wrightia tomentosa Roem and sch	Do.	Veppalai.
197	Xeromphis spinosa	Rubiacoae	Karai.
198	Zingiber officinate Rose	Zingiberaceae	Inji.
199	Ziziphus mauritiana Lank	Celastraceae	Elandai.
200	Ziziphus oenoplia Mill	Do.	Churamulu.
201	Ziziphus rugosa Lam	Do.	Kattielandai.
202	Ziziphus glabrata	Do.	Karikattan.
203	Ziziphus xylopuyrus wild	Do.	Kottaielandai.

APPENDIX—XVII.

LIST OF FAUNA OF KAMARAJAR DIVISION.

	Local Name.	Scientific Name.
	(1)	(2)
	MAMMALS.	
1.	Bonnet Macaque	Macaca radiata.
2.	Common Langur or Human Monkey	Presbytis entollus (Dufresne).
3.	Slender Loris	Loris tardigradus (Linnaeus).
4.	Leopard or Panther	Panthora Pardus (Linnaeus).
5.	Jungle cat	Felis chaus (Guildenstaedt)
6	Common Palm Civet or Toddy cat	Paradoxurus hormaphroditus (Pallas)
7.	Striped necked Mongoose	Herpestes vittocollis (Bennett)
8.	Striped Hyena	Hyaena hyaena (Linnaeus).
9.	Jackal	Canis aureus (Linnaeus).
10.	Indian Fox	Vulpus bengalensis (Shaw).
11.	Dhole or Indian Wild Dog	Cuon alpinus (Pallas).
12.	Sloth Bear	Melursus ursinus (Shaw).
13.	Common Otter	Lutra lutra (Linnaeus)
14.	Yellow throated Martens	Martes flavigula (Boddaert)
15.	Logeared Hedgenog	Hemiechinnue anritns (Gmelin).
16.	Grey Musk shrew	Suncus murinus (Linnaeus).
17.	Flying fox	Pteropus gigantus.
18.	Brown Flying Squirrel	p.p. phillippensis (Elliot).
19.	Malayan Giant Squirrel	Retufa bicolor (Sparrmann).
20.	Five stripped Palm Squirrel	Funambulus palmarum (Linnaeus).
21.	Indian Gerbille	Tatera indica (Hardyicke).
22.	House Rat	Rattus rattus (Kinnaeus).
23.	Handiceot rat	Bandicota indica (Bechstein).
24.	House Mouse	Mus musculus (Linnaeous).
25.	Indian Pereupino	Hystrix indica (Kerr).
26.	Indian Hare	Lopus nigricollis (F. Cuvier)
27.	Indian Elephant	Elephas maximum (Linnaeua).
28.	Gaur or Indian Bison	Boz gaurus (H. Smith).
29.	Nilgiris Tahr	Hemitragus hylocrinu

	Local Name.	Scientific Name.
	(1)	(2)
30.	Sambhur	Carvus unicolor (Kerr).
31.	Chital or Spotted Deer	Axis axis (Erxleben).
32.	Muntajac or Barking	Munticacs Muntjak (Zimmermann).
33	Indian Spotted Chevrotain or Mouse-Deer	Tragulus maminna (Erxleben).
34.	Indian Wild Bear	Sus sorofa csristatus (Linnaeus).
35.	Indian Pangolin	Manis crasicaudata (Gray).

BIRDS.

	Local Name.	Scientific Name.
1.	Ashy-Crowned Finen-Lark	Fremopteryx grisea (Scopoli)
2.	Purple sunbird	Cinnyris asiaticus (Lathamoli).
3.	Purple rumpled sunbird	Cinnyris zeylonicus (Linnaeu).
4.	Indian Pitta	Pitta brachyura (Linnaeus).
5.	Yellow-fronted peid or Mahratta Woodpecker	Dryobatesmahrattensis (Lathams).
6.	Golden-backed woodpecker	Dinopium benghalense.
7.	Grimeson - breasted Barbet or coppersmith	Magalaima haemacephala (Muller).
8.	Common Hawk-euckoo or brain-fever bird	Cuculus varius (Vahl).
9.	Pied crested cuckoo	Glamator jacobinus (Boddaert).
10.	Koel	Eudynamis scolopaceus (Linnaeus).
11.	Crow-pheasant or Coucal	Centropus sinensis (Stephen).
12.	Alexendrine or Large Indian parakeat	Psittacula eupatria (Linnaeus).
13.	Rose-ringed Parrakeet	Psittacula krameri (Scopoli).
14.	Slanty headed parakeet	Psittacula himalayana (Linnaeus).
15.	Blossor-headed Parakeet	Psitacula cyanoeephala (Linnaeus).
16,	Roller or Blue Jay	Coracias benghalensis (Linnlus).
17.	Common Green Bee-eater	Meropa orientalis (Latham).
18.	Pied Kingfisher	Haleyon smyrnensis (Linnaeus).
19.	Common Grey Horn Bill	Tockus birostris (Scopoli).
20.	Hoopoe	Upups Epops (Linnaeus).
21.	House swift	Apus affinis (Gray).
22.	Palm swift	Cypsiurus parvus (Lichtenstein).
23.	Barn or sereeneh Owl	Tyto alba (Scopoli).
24.	Indian Great Horned Owl	Bubo bubo (Linnaeus).
25.	Spotted Owlet	Athene brama (Temminck.)

Local Name. (1)	Scientific Name. (2)
	BIRDS—cont.
26. Black or King vulture	Torgon calvus (Scopoli).
27. White backed or Bengal vulture	Gyps bengalensis (Gmelin).
28. White Scavenger vulcute or pharaoh's chicken ..	Neophron perenopterus (Linnaeus)
29. Red headed Merlin	Falco chioquera (Daudin).
30. Crested Serpant-Eagle	Spilo. nis cheela (Latham).
31. Crested Hawk-Eagle	Spizeatus cirrnatus (Gmelin).
32. Brahminy kite	Haliastur indus (Boddart).
33. Common Pariah Kite	Milvus migrans (Boddaert).
34. Black-Winged Kite	Elanus coerulens (Desfontaines).
35. Bale Herrier	Circus macrourus (Gmelin).
36. Shikra	Accipiter badius (Gmelin).
37. Blue Rock Pigeon	Columba livia (Gmelin).
38. Emerald or Bronze winged Dove	Chaleophaps indica (Linna).
39. Spotted Dove	Streptopelia chinensis (Scopoli).
40. King Dove	Stroptopelia conegalensis (Sinnaepus).
41. Little Brown Dove	Stroptoplia senegalensis (Sinnaeus).
42. Common peafowl	Parvo oristatus (Linnaeus).
43. Grey Jungle Fowl	Gallus sonnerati (Femminck).
44. Red spurf Fowl	Gallopordix spadicea (Gmelin)
45. Jungle Bush Quail	Ferdicula asiatic (Latham).
46. Grey partridge	Francolinus pondicerianus (Gmelin).
47. White breasted Waterhen	Amaurounis phoenicura (Pennant).
48. Bronz-winged Jacana	Metopidings indicus (Latham).
49. River Tern	Sterna aurantia (Gray).
50. Spotted - billed or Grey pelicon	Pelecanus philippensis.
51. Little cormorant	Thalacreeorax higer (Vieillot).
52. Parter or snake-bird	Anthinga rufa (Daudin).
53. Spoonbill	Platulea leucorodia (Linnaeus).
54. White Ibis	Threskiornis melanocephalus (Latham).
55. Black-necked stork	Xenorhynachus asiaticus (Latham).
56. Painted tork	This leucocephalus (Pennant).

Local name. (1)	Scientific name. (2)
57. Open-billed stork	Anastomus oscitans (Boddaert).
58. Grey heron	Ardea cinerea (Linnaeus).
59. Little Egret	Egretta garzetta (Linnaeus).
60. Cattle Egret	Babulcus ibis (Linnaeus).
61. Paddy Bird or Pond heron	Ardeola grayii (Sykes).
62. Night heron	Mycticorax nycticorax (Linnaeus).
63. Chestnut Bittern	Ixobrychus cinnamomeus (Gmelin).

REPTILES.

1. Tortoise	Geomyda trijuga.
2. Minotor Lizard	Varanus moniter.
3. Tree Lizard	Caletea veraicolar
4. Ground Lizard	Mabuya Carinata.
5. Green Lizard or Ohameleon	Chomaeleon zeylanicus.
6. Russel's viper or Daboida	Vipora reessellli.
7. Saw scaled viper or Echi'a or Phooran	Echia carinata.
8. Cobra	Naiatripudiana.
9. Slender coral snake	Calliphia trimaculatus.
10. Common Krait	Bungarus caerulena.
11. Rock or Indian Python	Python molurus.
12. Common water snake or Dhaman	Zamensis mucusus.
13. Sand snake	Psammophia condaranus.
14. Common wolf snake	Lycodon sulicus.
15. Common Pond snake or keel back	Tropidonotus pi-scatei.
16. Indian Bronze backed tree snake.	Dendrolaphis triatis.
17. Brown spackled whip-snake	Dryophis pulveruleutus.
18. Zebra snake	Co-hersydrus granulatus.
19. Nellai Pambu	Cerborus mhynchopa.
20. Valakkadian	Euhydrina Vakakkadian

ANNEXURE—XVIII.

RIGHTS AND CONCESSIONS ADMITTED IN THE R.Fs. OF KAMARAJAR FOREST DIVISION.

I. Srivilliputhur R.F. (Upper slope) :

The following rights of way are admitted :—

1. In Kollangondan and Venga nallur Block known as Kombathakadavu way from Rajapalayam via. Nirathaiyanar.

2. In Valakulam Block a path leading from Srivilliputhur and neighbourhood via., Shenbagathope to Pemalai and beyond.

3. Vartirayiruppu road—from Varthirayiruppu and neighbourhood via., the Periar Valley to the Gandamanayakanur.

4. Right to worship at Maheswariamman koil and to conduct all acts incidental their to within a rectangular space measuring 117 x 90 links around the temple. The temple is situated at a distance of 2 miles 2 furlongs 7 chains 72 links from survey number 2114 of Rajapalayam.

Right to occupy or camp at a rectangular space measuring 156 x 60 links during time of workship at the above said Ammankoil. The camp site is 850 links from south-west corner of Ammankoil to be approached by a foot-path 12 feet wide from the path leading to temple. The distance of foot-path is 9 chains 89 links and is open to pedestrian only.

Right of way over the foot-path leading to the temple or open to general public to a width of 10 yards. It enters the reserve on the western boundary of Srivilliputhur R.F. (Lower slopes). After running through it for a distance of one mile 8 chains from survey number 2114 of Rajapayalam village. just to east of Ammankoil are runs generally north-west and north for a distance of 1 mile 1 furlong 9 chain 72 links and reaches the north-west corner of the temple area.

II. Srivilliputhur (Lower slope) :

1. In favour of Zamindar of Sivagiri right is admitted to tabe the water of two natural streams skirting the north and south base of Moonjimalai hill and flowering naturally into Pudukulam tank of Kottaiyur village, without prejudice prejudice to what may naturally flow into other channels.

2. In favour of ryots of Thirumangalam, Narayana puram and Vasudevanallur village. The right to the use of water from the Kulasekarapuri channel supplied by the Palayar alias Thalayaniar and to enter upon, clear and require the channel when necessary. This right is for the beneficial enjoyment of the wet ayacut of the Kulasekarapuri tank as also that under Kadanachankulam and Alagikulam of Thirumalapuram village.

3. The right to the Samudhayam patta usufruct over 696 tamarind trees in the limits of Naranapuram Village and 474 tamarind trees in the limit of Vasudevanallur village, total 1,170 tamarind trees is admitted in favour or the said villagers subject to any rules that the Government pass under Section 12(*b*) of the forest Act and provided. (*a*) The rights shall not be alienated by way of grant, sale, lease, mortgage or otherwise without the sanction of Government under sec. 19 of the said act. (*b*) that no access shall be had to the trees without the permission of the Forest Officer not lower the rank of forester, except during the months of January to June both inclusive. The produce obtained may be sold or bartered.

Right of Way for men.—The Kanavoi path from Srivilliputhur and other villages to Pudupatti, Khansapuram, Watrap and other villages. The path enters the reserve at S.F. No. 40 of Venkateswarapuram village between forest pillar Number 71 and 72 proceeds in a north-east direction for 2,200 yards and leaves the reserve between forest pillars 13 and 14 entering S.F. No. 1079 of Pudupatti village to be used throughout the year.

An area around the Renkarkoil thotti demarcated by 5 cairns, the north-east cairn no 2 at a distance of 1.5 chains from the cairn no. 1 at the north-west corner bearing 103 and ½o from it.

The area around the Renkarkoil temple demarcated by 4 pillars the south-eastern most of which is 570 links distant and bears 16 and ½o north from the coupe stone on the R.F. bundary within the pillars 93 and 94 in Venkateswarapuram village. The South-East corner main temple building nears 290 m from South-west corner of the enclosure.

Within these areas trees may be planted for shade, but no felling or lopping of any trees will be permitted and the Government reserves the right to sell any trees which may fall or die. Access to these areas will be allowed by a path 6 feet wide entering the reserve on the eastern side of coupe stone and running into Rengarkoil enclosure about 7 yards west of its south-east corner. The path leaves again at the north-east corner and runs north-west for a distance of 48 chains entering the Renkarkoil Thotti enclosure on the eastern side of cairn No. 5.

Kaluda kadavu path.—This path is 10 yards wide open for men and cattle enters at pillar 27 of R.F. boundary and runs in a north-west direction for 16 chains thence it runs in a westerly direction for 18 and ½ chains thence again in a north -west direction parting the east side of Kaluda kadavu at 4 furlong 3 chains and meeting the Vellakal theri bridle path at 5 furlongs 8 chains 88 links from R.F. boundary.

The path then follows the last 9 bridle path for 9 chains 32 links. After leading the Vellakal theri bridle path it continues to run in a north-west direction crossing Niraviathu river and cairns line at 1 mile 2½ chain and 1 mile 2 furlong 5 chains respectively from R.F. boundary. From this point the path continues as hitherto in a north-north-west direction up to Kambathamedu.

Path 2, Nirathaiyanar Koil.—This path is 10 links wide and open for men and cattle. This enters the reserve at 2 chain to the east pillar number 167 (corresponding to pillar Number 165 on the survey of India)

crosses the Nirathayanar river between 2 and 3 chains and turns in a north-west direction at 3 chain 74 links, thence it runs turns again in a northerly direction at 5 chain 14 links and ends at the temple 6 chains 44 links. The total length of path is 6 chains 44 links and its breadth is 15 to 20 links up to 5 chains 14 links and thence it is 5 links.

Karuppusamy Koil. —Consists of a few idols under a tamarind tree. It occupys an area of 0.195 acres. It is situated in XVI of Pudupatti fuel working coupe in the lower slopes of Srivilliputhur R.F, V-A-32 and is about 8 chains south of R.F., boundary between pillars 97 and 98. It is reached by a path 5 feet wide which is open to men and may only used by day. The path enter the reserve from a point 120 links of west of pillar 97 and runs in a south west-direction for 159 links, thence it runs in a southerly direction to the temple crossing the north and south banks respectively of Chithar stream at 164 links and 299 links from the point at which the part enters the reserve. The total length of path is 884 links.

III. Unippattu R.F. :

.. Right of way for men and cattle. The path enters the reserve 15 yards south of cairn No 2 joins the boundary again at 15 yards north-west of that cairn follows it as far as cairn No. 75 quitting the reserve at that point. It re-enters to the reserve immediately and goes back to the boundary 73 yards of west by south of cairn No. 74 cut across the corner at cairn No. and leaves the block south of cairn No. 72 and to be used through out the year.

IV. Pulpathi Parambu R.F. :

No right is admitted.

V. Kansapuram R.F. :

1. *Dam*.—Public Works Department has constructed. "Periyar Dam" in the western side of the forest block. The shutters and channel bunds cover 2.2. acres. Water spread area covers 4.3 acres. P.W.D., authorities ar allowed access to this area.

2. *Temple*.—Thavalaiperumal Koil situated on the centre top of the hill with a stone pillar 7 feet height on. an extent 0.01 acre It is being worshiped by Hindus Right of free worship and free access to public is allowed.

3. *Overhead tank*.—Constructed at the north - east corner of the hill by P.W.D. for suply of drinking water to the quarters. Extent is 0.01 acre. Free access to this tank is allowed to P.W.D., authorities for its maintenance.

4. *Roads and pathways*—

(*a*) A road leading to Periar dam whose length is 138.8 meter and which is 85 links to be used by the P.W.D. authorities.

(*b*) Road which leads to Thavalaiperumal Koil to a used by the public. Its length is 295 metres.

(*c*) A road leading to over head tank whose length is 273.4 metres is to be used by P.E.D. staff.

(*d*) A mud road on the eastern side of the forests whose length is 603.24 meters covering an area of 0.89 acres formed by P.W.D. is to be used by the P.W.D. authorities.

VI. Kansapuram Extension R.F. :

Right to the usufruit of the following Samuthayam Patta tamarind trees is admitted subject to such rules as may be made by the Governor in council under Section 12(b) of forest act and also provided that no sale or other alienation shall be made without the sanction of Government under section 19 o the Act. The pattadars are free to sell or barter the produce. Access to them will be 2 yards wide path open for people only during fruit season from the nearest point in the reserve boundary.

S.F. No.	1638	..	1 tree	4 trees.
	1580	..	1 tree	
	1556	..	2 trees	

Right to worship in the under mentioned temple is allowed to Shanaras and temple is demarcated out free from reservation and left as an enclosure within the block with the vacant space and access noted against it.

Kattumalayan Koil — 6 chains from north-north -west of the north-west corner of Survey Number 267 of Lakshmipuram village with a square space of $1\frac{1}{2}$ chain on each of four sites of stone enclosure.

Access will be a cart-tract 3 yards wide entering the block about 2 chains East of North-east corner of Survey Number 265 of Lakashmipuram village and running north west for about 2 chains and then north - west to the temple.

VII. Valaikulam R.F. :

Right of way to the public over Pechikadavu path. The length of the path is 32 chains and with 10 feet. This runs through the forest from west side of survey numbei 360 to south side of Survey number 226 both of Valakulam This path is open in rainy season only (i.e.) 9 October to February for people and cattle.

Right of way to public over a cart-tract along the northern boundary of the forest between the S.No. 295 and south west corner of survey No. 231 both of Valai kulam. The length of the path within the forest are is 23 chains and width is 10 feet.

Eight to patta usufruct over 48 tamarind trees lying along track number 2 in favour of Pichu Iyengar and others of Valaikulam village subject to any rules that may here after be made by Governor of council under section 12 (*b*) of forest Act provided no grand. leases sale, mortgage or other alienation shall be made without

the sanction of Government in accordance with section 19 of Forest Act. That no access shall be had to ths trees without the permission of the Forest Officer except during January to March The pattadars are free to sell or borter the produce.

VIII. Sappani Parambu R.F.:

Right of way for men, cattle, and carts through the R.F.. to be used by the habitants of Rajapalayam Sambanthapuram, Alagapuri, Valaikulam and the other adjoining village to be used round the year. The path enters the reserve at a point about 1 chain north of pillar 25 and trends along the eastern northern boundary of the reserve as far as cairns No. 20 at which the quites the result.

IX. Kothenkulam R.F. :

1. Right of way in favour of villagers of Thottiapatti from their village to Kiripatti Urani via., the Odai (Jungle stream) running from about 100 yards through the forest. The Odai is about 15 feets wide and open for men and cattle.

2. The following places of worship are excluded from reservation, but retained as enclosures within the R.F. :—

(*a*) Lamp-post, on **Kiripattimalai**, on a rock measuring about 12 cubi sqcuare, approached by a path from the east of Keelpatti Urani about a furlong long and 3 feet wide.

(*b*) Lamp-post, Perumalkoil and a thatched madam with surrounding land, the whole measuring 1.36 acres at a spot called Padadi on the east slope of the southern portion of the hill. It is approached by 2 paths, one from the south, 2 furlongs length 6 feet wide and other from the east one furlong long and 6 feet wide.

(*c*) Lamp-post and a Masandrymadam with surrounding land the whole measuring 53 cents, at the Cumbattaperumal Uchi. This is approached by a path from lamp-post (*b*) 1 furlong long 6 feet wide. The paths a, b, and c are open for people only.

X. Kollankondan Block I R.F.:

Cart-tract No. 1. the width is 20 links and it enters in the North-east corner at a cutting point of 25 links east from theodalite staion between S. F. Nos. 2056 and 2216 of number 39 Kollankondan village. It runs towards south-west two 702 links into the forest. Then it exists the forest boundry at 32 links north from theodlite station in S.F. No. 2217 of the village. Then it entersthe forest boundary in the south at a cutting point 102 links from the theodalite station beween S.F. Nos. 2219 and 2220.

Again it runs towards west to a distance of 745 links and it exist forest a cutting point of 35 links from theodalite station, between S. F. No. 2222 and 2225. Then it runs through patta lands. *Cart tract No. 2.* Width is 20 links. This enters into forest at a cutting point of 130 links south from the junction stone between Survey Numbers 2219 and 2220 of the village and runs towards south to a distance of 359.6 meters, Then it exists the forest boundary at a cutting point of 76 links north from the bend stone of Survey field number 2226. Again it runs through patta lands.

These cart-tracts are for the use of ryots around the forests to go to their fields and they are allowed free accessed to use these cart-tracts.

XI. Kollankondan Block II R.F.:

No right is admitted.

APPENDIX—XIX

METEOROLOGICAL DATA

STATION : ARUPPUKKOTTAI.

Year.	Mean tem.		Relative Humidity.		Mean tem.		Relative Humidity.		Mean tem.		Relative Humidity.	
	Daily Max. in O.C.	*Daily Mini. in O.C.*	*Recor dedat 08.03 hours.*	*Recor-dedat 17.30 hours.*	*Daily max. in O.C.*	*Daily mini. in O.C.*	*Recor-ded at 08.03 hours.*	*Recor-ded at 17.30 hours.*	*Daily max. in O.C.*	*Daily mini. in O.C.*	*Recor-ded at 08.30 hours.*	*Recor-ded at 17.30 hours.*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	JANUARY.				FEBRUARY.				MARCH.			
1981	33.6	19.7	77	49	34.3	21.2	74	44	38.6	24.8	75	44
1982	31.5	N.A.	79	51	33.8	N.A.	75	40	37.0	24.1	73	44
	APRIL.				MAY				JUNE.			
1981	39.3	26.6	71	57	38.2	25.9	66	52	35.8	25.3	64	52
1982	38.2	25.6	72	54	37.8	25.6	71	59	37.9	25.5	69	57
	JULY.				AUGUST.				SEPTEMBER.			
1981	36.9	24.4	69	56	36.9	24.5	68	49	34.4	23.9	75	63
1982	37.7	25.7	65	50	37.6	25.6	64	49	37.5	24.3	69	61
	OCTOBER.				NOVEMBER.				DECEMBER.			
1981	33.4	23.9	81	71	33.1	23.2	80	68	30.7	22.4	80	62
1982	34.2	23.8	78	70	30.7	23.2	83	78	29.8	27.3	77	62

N.A.—Not available.

Aruppukottai being a sick station Meteorological data are not collected regularly from the records it was found the complete data available is only for the year 81 and 82. Hence the data for those years are furnished in this appendix.

50-1--32

APPENDIX—XX [

REPORT ON FIELD VISIT TO RAJASTHAN AND MADHYAPRADESH ON AERIAL SEEDING.

The Forest Department of Tamil Nadu has embarked upon large scale planting activity to cover the degraded forests and waste lands in the state. The normal forestry activities particularly in difficult and remote areas need heavy financial sources, considerable man-power and is also very time consuming with a view to wing difficult and heavily degraded areas under tree cover quickly within a reasonable time, at a comparatively less cost. Various methods need to be analysed and its suitablity to such area asceitained. An exercise was undertaken to study and find out the suitablity of aerial seeding as a means to achieve the above. Broad-costing of seeds from air-crafts is a recorgnised technique in Australia, Newzel and Canada and U.S.A.

Aerial seeding was first tried in 1950 in Gujarat to stabilize sand dunes. Aerial was taken up on a substantial scale by Chambal comand area development authority in Madhya Pradesh in 1980 and 1981. In 1982 aerial seeding was also tried in Chambal ravines of Uttar Pradesh, Madhya Pradesh and Rajasthan. Up to 1986 aerial seeding was carried out over 0.147 million hectares in this States of Madhyapradesh, Maharashtra, Uttar-Pradesh, Rajasthan, Karnataka, Gujarat and Orissa.

The aerial seeding as a means a afforestation was tried in the above States with the following consideration:—

1. All these areas are deep and remote.

2. It is difficult to get labour for normal forestry planting works in these areas that too within a short period during monsoons.

3. Aerial seeding is found to cheaper than afforestation by convensionaly methods.

4. Aerial seeding technique, provided, a possibility of applying seeds in denuded areas, where soil and climatic conditions are still favourable, but naturally needs some assistance by way of uniform seed disposal.

5. Surplus seeds in certain areas could be diverted to seed deficient areas for eco--rehabilitation works.

6. It is also depend upon the possibility of suitable mixer andcomposition of speciesthrough extensive aerial seeding.

Experiences in India.—

(a) *Species tried* :

The seeds of Prosopis juliflora, Acaia nilotica were mainly tried in most of the states like Uttar-Pradesh, Rajasthan etc., The state like Maharashtra and Madhya-Pradesh. Dendrocalamus strictus has also been tried.

(b) *Quantity of seeds used* :

About 15 to 20 tonnes of seeds per ha. were tried of the above seeds, mainly during permonsoon earlier and also during monsoon in later weans.

(c) *Method of seeding* :

Beaven type aircrafts/Basant were mainly used for aerial seeding operations. These aircrafts have a load carrying of 600 Kg. per.

(d) *Pretreatment of seeds* :

The seeds of Prosopis. Acacia and Bamboo were collected and pretreated with hot water before broadcasting. No other pre-treatment was applied to the above seeds.

(e) *Ground preparation* :

Demarcation of boundaries were done with a lime coated earthern mounds. Earthern and broushwood checkdam were constructed across quallies. Soil working was done in the form of hotches of size 30 x 30 x 15Cms. In the form of hoeing and upturning the soil. The contour trenhes of varying length and uniform breadth and depth of 30 x 30 cms. were also made wherever possible. The cattle proof trenches were also dug of deeper dimensions in heavilly grazing susceptible areas also.

(f) *Monitoring* :

This is carried out in representative plots of 10 x 10 cms. by plant counts.

Results of the works done earlier :

Evaluation carried out in Chembal Ravine areas, by the respective department shows that you only one species prosopis juliflora has favourably responded to Aerial seeding. Though some needing of Acacia nilotica and Acacia catechu were observed their number was for from satisfactory. The problem with Aerial seeding is lack of establishment after germination due to many factors like hand soil, washing away of seed and seedlings during monsoon, heavy biotic pressure, etc. Germination of seeds and survival percentage were reported to be generally poor in most of the seed, on account of various factors.

Field observations on Aerial seeding in Rajasthan and Madhya Pradesh.—

We visited Dholpur in Rajasthan and Morena in Madhya Pradesh to study the performance of Aerial seeding in Chambal Ravines.

Dholpur :

The Aerialy seeded areas in Dholpur in 1982 (Dangbasal) and 1987 (Lalpur) were visited by us on 19th August 1987. It was found that in 1982 an area of 1,500 ha. was aerially seeded with Prosopis juliflora and Acacia nilotica. It was observed that only Prosopis has responded favourably and about 1,500-2,000 seedlings per ha. in patches have come up, successfully. It was also noticed that the above seedlings have mainly come up due to the effort taken in the form of hand dibbling of seeds, as a supplemental measures. Successive established seedlings of Prosopis were mainly noticed on the mounds above the contour trenches made where the seeds have been dibbled by hand in lines.

In the year 1987 an extent of 1000 ha. was serially seeded at Lalpur in the month of June, mainly with Prosopis juliflora and Acacia nilotica. It was observed that no germination and establishment of seedilings has been achieved in this area practically wherever seeds have been

sown by hand on the mounds above the contour, a certain amount of seedling of *Prosopis juliflora* could be seen of about 5 to 10 cms in height.

Morena :

The serially seeded areas in Morena districts in 1985 at Aisha was inspected and studied on 20th August 1987. An area of 5,000 ha. was serially seeded in 1985, in Morena forest Division along the Chembal Ravines. About 15 Kgm. of seed per ha. of different species mainly prosopis juliflora, Acacia nilotica Acacia catechy and Dendrocalamus strictus were tried here. An expenditure of Rs. 871 per ha. was incurred for the above operations (Rs. 4,35,773 for 5,000 ha). In 1987, the expenditure per ha. in adjacent areas is found to be about Rs. 115 (excluding the higher charges of air craft) Enumeration of successfully established seedlings in the month of January 1986 by lying sample plots of 10 x 10 m size (100 plots at different places) and the results are as under.—

Bamboo	..	2500/ha.
Babul	..	2400/ha.
Prosopis	..	1500/ha.

We have observed that in the above area, the success is not as high as is made out by the Department. In general it was found that the success of the established seedlings is about 2000 per haof all three species put together and that too, where the aerial seedling has been supplemented with hand dibbling of seeds manually.

An area of about 25 ha. adjacent to the above plot. In 1985 was regenerated by dibbling seeds manually mainly with Acacia nilotica. The area was candomed off with cattle proof trenches. It was found that by spending about Rs. 3,000 ha. a large number of seedlings has been established successfully.

Future proposals :

From the experience gained, of using aerial seeding as an alternative method for biological upgradation in India. It is best suited to sites which are in accessible steep, remote and of rugged terrain where seeding/planting on a massive scale, in a limited period of time, is almost impossible, It has been tried mainly in very steep hill slopes and arid areas to be subjected to biological upgradations are totally accessible and are quite steble areas which can approached manually and tackled. It has been established the very extensive ground preparations are necessary for successful aerial seeing. This has to be done in the form of preparing receiptive seed beds for proper germination and establishment. The aerial seeding as alternative method of biological upgradation is conductive in areas where there is a shortage of labour. This is not the case with reference to Tamil Nadu. Aerial seeding cannot be a substitute for the traditional and conventional methods. In Tamil Nadu where the afforestation has to be done with more sensitive and useful species of either dry mixed deciduous type of ever dry scrub type. The aerial seeding is only conducive to most handy species like Prosopis juliflora which should not be used for covering the tended areas vegetation in Tamil Nadu. The seeds of the species of dry mixed deciduous are not suitable for being subjected to aerial seeding due to the seed being very light in weight and the technique of pellatisation of these species has not been even attempted in India. The site has to be prepared extensively before the seeding operation, for prompt seed germination and seeding survival. It is very time consuming and prohibitively costly. The aerial seeding demands usage of large quantity of seeds is prohibitively costly. It is extremely difficult to connet large quantity of viable seed in a very short periodof time for usage in 1987 hains.

Eventhough very large areas needs to be clothed with vegetation in a short period of time, it is imperative that it should be more effective and successful. It is an accepted fact, that the conventional method. of planting the container seedlings is not suitable for covering very large areas in a short period of time. Therefore, an alternative and viable method of afforestation needs to be evolved. This method should be cheaper and could be dlne in the shortest time available. It should also be more labour oriented Direct dibbling of minimal quantity of seeds, uniformly throughout the area after or simultaneous ground preparation can be ideal if afforesting large degraded areas within shortest period of time. The soil should be racked up to the minimum extent to prepare a receiptive seed bed for germination and establishment and the seed dibbled manually by walking along the contours in hills. It is better to pelletise the seeds and then dibble them in the field. But as the pelletation has not been perfected and there is no sufficient plant capacity available, it can be done on an experimental scale, with the seedlings facility already available at the Winsco, New Delhi".

In the year 1987, the manual dibbling of seeds can be done in 1000 ha. in Andiappanur Reserved forests of Jawadhi hills in North Arcot District.

The following species can be used .—

1 Dendrocalamus strictus	..	..	2 tonnes
2. Anona	.. .. ..	..	2 tonnes
3. Santalum ambum	.. ..	..	500 Kg.
4 Hardwickia binata	.. ..	..	500 Kg.
5. Ailbizzia lebbeck	.. ..	..	500 Kg.
6. Wrightia tinctoria	.. ..	..	500 Kg.
7. Pithacollobium dulca	..	..	500 Kg.
8. Aeacia ferruginea	.. ..	..	500 Kg.
9· Acacia leucophloea	..	..	500 Kg.
10. Acacia nilotica	.. ..	..	500 Kg.
			8 tonnes.

The above species may be mixed and sown manually (Kg. per ha.)

The comparative statement of expenditure details for aerial seeding and manual dibbling of seeds is appended herewith.

AERIAL SEEDING EXPENDITURE DETAILS.

Serial number.	*Description.*	*Rate.*	*Per Unit.*	*Amount.*
(1)	(2)	(3)	(4)	(5)
1	Collection of seed 20,000 Kgs.	25.00	Kg.	5,00,000
2	Ground preparation soil working in hotches of 30 x 30 15 x Cms. (1300 hotches pes hectare).	0.15	One hotch.	45,000
3	Digging of contous trenches of 1 metre length 15 Cms. depth and 15 Cms. With (1000 Nos. per hectare).	0.25	One trench	2,50,000
4	Preparation of an ais strip of 2000 feet x 100 feet	..	One	10,000
5	Hire charges of Air craftx..	55.00	Hectare	55,000
6	Pay of protection mazdoor at the rate of onemaz door per 100 hec. (for one year).	250.000	Month	30,000
7	Cost of transport of seeds from various centres to working spot.	..	..	10,000
8	Contingencies purchase of gunny bags, pre-treatment of seeds, cost of erection of temposary sheds, erection of boundary identification marks, etc.	..	..	25,000
				8,25,000

Rs. 825 per hectare.

EXPENDITURE DETAILS OF MANUAL DRILLING OF SEEDS.

1	Cost of seeds 8 Kgs., per hec. at the rate of Rs. 25 per Kg. (8000 Kgs.)	2,00,000
2	Cost of preparation of ground 5000 hotches per hectare of 10 x 10 x 10 cubic cms. 4 paise per hotch 5000 x 1000xand dibbling.	2,00,000
3	Tending mazdoor pay at the rate of Rs. 250 per month 100 hectare for one years ..	30,000
4	Chontingencies	10,000
		4,40,000

(Rupees 440 per hectare.)

APPENDIX XXI.

FIELD INSPECTION NOTES OF THIRU S. KONDAS, I.F.S, CHIEF CONSERVATOR OF FORESTS, MADRAS.

Accompanied by the Conservator of Forests, Tirunelveli circle, District Forest Officer, Tirunelveli Division and Working Plan Officer, Tirunelveli, inspected a stretch of Western Ghats eastern slopes from Gundar Reservoir to the boundary of Tirunelveli Division and the Kamarajar Division (Deviyar river). The Working Plan Officer has prepared the reconnaissance report for the forests of Tirunelveli Division.

2. This section of the Western Ghats falling within Thirunelveli Division more presisely in Shencottah taluk had undergone fuel working in the 30s and 40s confined mostly to the foot hills and to some extent to the lower slopes. Now all these areas are degraded (with some regenerative potential still present) and also denuded to varying extent devoid of potential as along this length. The denudation was increasing has one moved from Tirunelveli towards the boundary of Kamarajar district. The geological formation of thil section of the Eastern Ghats was striking by prepipitous rocky slopes mainly in the middle one-third altitude of this whole range. The upper one-third from the ridge down was well covered by natural forests. The occurrance of these forests appear to be mainly influenced by the spill over effect of the south-west monsoon. Because of the inaccessibility due to precipitious rocky slopes, the forests are mostly free from illicit cutting. The middle rocky face were not totally bare, but covered thinly by grasses of two species *Gymbopogen contortus* and species like Ficus, Sterculia, etc.,

3. Since the slope has the spill over effect of the south-west monsoon, it has been serving as an important component of catchment for a number of streams which in turn maintained reservoirs and ultimately a good agricultural supporting system in the adjoining plains. Apart from few old small dams constructed here and there, big and small reservoirs have been formed in the 70s by damming some of the important streams outside the reserved forest limits. The working Plan Officer was asked to examine in grater detail the water harvest from these slopes.

4. As a first steps of the work, fuel coupes degraded and denuded should be taken up with suitablefire wood species supported by soil and moisture conservation. Illicit cutting had been rampant and this had to be considered if we were to arrest further onslaught on the remaining forests. Then came the question of providing some vegetal cover for the rocky faces to improve water harvest and to reduce radiation, thereby bringing environmental amelioration. For this purpose various species of ficus and other rocky tree species should be identified, screened for high and low, rainfall areas and subjected to nursery afforsatation techniques. It was unfortunate that ficus had not been erreceiving that much of attention which it deserved Though an inferior timber and fire-wood species, ecological it is an important group of plans capable of providing enduring cover in rocky situation were other species were practically ruled up. In one place almost on the Kerala, Tamil Nadu border over looking Shengottah-Themnala road, was a medium sixed ficus tree. Quriously it was perched on a huge boulder of 15 feet tall, secured by thick platened roots running down the boulders like strapping and then entering the soil. The girth of the stump would be easily 150 cms. Such a tree termly anchered to the soil was holding the boulders from rolling down the slobes on to the road. Such Ficus species originated as minute seedling on the top of boulders probably favoured by bird disposal, develop a few thing aerial roots which survive epiphytically in the early stages. After reaching the soil around the boulder, they grow for, thickened and then promote a vigourous stem growth. Show this is in short the various stages of growth of rocky ephphysti Ficus. Such Ficus occur in very high rain-fall areas as well as in low rain-fall hills all the time occurring on rocky faces or boulders, and interesting eco-physiological phinominol. In the early stages the seedling development is possible and highly desirable for the purpose of increasing the composition of these species in the western Ghats in rocky situations. It is still not understood why such Ficus species did not grow straight away from humous rich soil right form the beginning. However, the peculiar ecological endowment confired on such species can be taken full advantage for the purpose of vegetating rocky slopes and also for securing rolling boulders on the slope of Ghat roads. Similarly the grasses can be identified particularly the clump type grown in nurseries and then builds in patches on rocky slopes. Smooth surface prevents the grasses from securing a hold and then enlarge. Perhaps some site preparation leaving rough surface on such rock surfaces may be useful in establishing grass turf

5. Inspected 1970 Advikadu teak plantation in Puliara Reserved Forests of Shencottah Range. Although the stand was satisfactory, the forest floor subjected to heavy erosion with the leaves 1 to 2 feet with danger of further deepening and spreading. The forest road was almost dared of any under growth. While analysing the reason for such severe erosion, even-though the rain fall was not high, it was noted that the total absence of leaf litter was the main cause for erosion. Teak leaves esily disintegrated and decomposed fact resulting in practically no littere accumulating on the forest floor. The absence of other under growth and steepnes of the slope had aggrevated erosion. An adjoining area in the same slope under natural mixed forest, revealed that practically there was no soil erosion. This could some littes layer present under the mixed forests. So the lesson to be learned from the protective functioning the natural forest and teak plantation was mono-culture of such specie with poor litter accumulation should be avoided in the interest of soil and eater conservation Now the problem to be tackled by the Working Plan Officer was how to manage the teak-plantation of nearly 500 hects. raised in the past in this particular reserved forest. Similar series exist in other reserved forest as well with similar problem. One of the

suggestion to manipulate the stand dencity and ground and create favourable condition on forest floor and promote natural under growth which would as sufficient litter and also prevent soil wash. Such treatment cannot be considerzd as thinning or selection felling for improvement felling. Perhaps, it can be termed as "site improvement felling" rather than "stand improvement felling". In addition to appearance of natural vegetation, attempt should be made to build up a good under growth of bamboos. A regular understorey of bamboos in teak forests of Alapalli in Maharashtra State is a classifical example. Wherever erosion was severe suitable engineering structures would also be included. The possibility of diverting the rain-water by stream water drain should also be examined.

6. Coming back to small reservoirs located at the foot-hill it was suggested that attempt should be made to desuade the private owners of enclosures from taking to any cropping resulting in breaking the ground and loosening the soil. Over-looking the Mottai reservoir in Puliara R.F. were private coconut grower fairly well maintained. The forest department should persuade these owners to take other each tree crops like clove. jack, and some fruit trees like Gauva to augment their revenue. In this sensitive Karungal or Catchment there are a number of enclosures in the Puliara R.F. and the District Forest Officer was asked to cheque the boundaries of the enclosures and keep a watchful eye on the encachment activities. This reservoir not only provides irrigation for agriculture but also drinking water to a population of more than 50,000 people. The capacity of the reservoir was 6.88 fts. and the ayacut about 366 hectrs. This was built in 1962 at a cost of Rs. 3.6 crores. The scatchment of this reservoir worked out to 850 acree and the ratio of ayacut catchment is 1 : 2.4. Another. reservoir is closed to this was Gundar across Karungalar Capacity of this reservoir 25 mcft. catchment area 2450 acres and Ayacut 1024 acres The ratio of Ayacut to catchment works our to 1 : 2. It was built in 1970 at a cost of Rs. 1.20 crores.

7. There was another minor irrigation project across Karuppa nathi in Krishnapuram beat. The catchment of this project worked out to 7250 acres and the Ayacut 9,500 acres. except for the top 1/3rd from the ridge. The catchment was very much degraded and even denuded. Unless a massive afforestation is mounted in these hills ranges. the purpose of constricting such reservotr would not be fulfilled. Use of rock species, particularly Ficus, assumes greater importance, as seen from the high frequency compared to any other species. The Conservator of Forests Research should take up a detailed study into identification, selection of suitable Ficus species. seedling ecology nursery technique and rock afforestation. This study should conducted in heavy, medium and low rainfall areas. since rock species also differ depending upon rain-fall Along with that, turfing the rock with suitable grass species should also be taken up.

8. As we were discussing the difficulties in vegetating this rocky slopes from the top of the hillock we could see hundres of famished cattle moving on the destructive path to the denuded hills in a troutine manner to find pasture. The working Plan Officer was asked to examine this aspect and select such pressure zone of grassing and take up species fodder resources development along the foot-hills. A head of cattle needs at least 5 Kgs. of green grass at the subsistance level and at this level, one may have to plan for providing a few thousand tonnes of fodder and a accacia pots for such cattle. This department has an obligation to provide for this cattle withign a distance for 4 to 5 Kms. from the boundary some persistance foddet. The Working Plan Officer also could provide all moisture conservation measures and plantation techniques fpr producing a good quantity of fodder species to the cattle.

9. *Ayyanarkoil water source.*—Thiss is the main source of water supply to Rajapalayam Municipality.. The Municipality has put up a low weir and diverted water into supply pipe to settling tank. The water can be improved by afforestation at the foot-hills as well as the lower slopes. The main stream which provides water supply should be protected against contamination by cattle, by fixing chain link fence on both the banks for a few Kms. uphill. At the same time, a certain minimum quantity should be, allowed to flow down for cattle and for other purposes At the time of inspection the chairman of the Muncipality came to the spot and discussed their readiness to associate themselve with water supply. The Working Plan Officer was asked to pay special attention to the sub-catchment of this stream and suggest suitable measures. The District Forest Office was asked to improve the short appraoch road within the reserved forest and improve the surroundings for the people who frequent the temple and for picnic purpose.

10. *Shenbagathope water supply to Srivilliputhur Municipality* :—

About 300 acres of lands carrying mainly tamarind and other miscellaneous species with Shenbagathope belongs to the local Andal temple. This block lies adjoining the reserved forest boundary. Within a few hundred metres from the boundary western ghat rise steeply. Considerable portion of the Ghats round the ridge downwards is precipitous rock and Officers no possibility of afforestation, much less vegetal growth. The only prospects for any afforestation is the worked fuel coupes measuring 2000to 3000 hectares at the foot-hills., and forming part of the catchment of the small river flowing through Shenbagathope., This carries water only during rains, particularly during north-east monsoon. The Srivilliputhur municipality and sunk 7 bore-wells rightin bed of the stream falling within the limits of Shenbagathope. During the dry season water is drawn from the wells for supply to the town. In the past one low weir was built across the river, but it was damaged in 1984 floods. The present water supply system depends heavily on water stored in the river course probably on account of hard geological substream as river bed. Since the hilly ranges offer very little scope for afforestation. An work on augmenting water supply should be on the river itself. A low weirs across the river at suitable intervals with foundation at suitable depth from bad level will hold moisture more efficiently, resulting in

large volume of supply through pumps. A large number of people led by the municipal chairman of Srivilliputhur Municipality met me at Shenbagathope and expressed their difficulty and distress their securing an interrupted water supply.

This area abounds in Grizzle squirrel and larger mammals like elephants. Some afforestation needs to be done to improve tree cover, fodder and water supply even outside the reserve limits from the point of habitant improvement for Wild Life. This may incidentally improve the water supply position also.

(Signed) S. KONDAS.
Chief Conservator of Forests.

APPENDIX.—XXII

Details of various species suitable for various handles as found out by the F.R.I.

	F.R.I.
Albizzia amara	220
Albizzia lebbek	220
Acacia nilotica	221
Thespecia populnea	216
Chloroxylon Swietenia	202
Morinda tinctoria	..
Azadarichta Indica	159

APPENDIX—XXIII.

A. Control Forms.

(a) Control book for the teak Plantation Working Circle.

Prescription of the Working circle.—

1. Year.
2. Name of felling series.
3. Coupe Number.
4. Area in hectares.
5. System of felling.
6. Number of exploitable trees (by species.)

Operations carried out.—

7. Year.
8. Name of felling series.
9. Coupe Number.
10. Surveyed area of coupe in hectare.
11. Nature of fellings.
12. Number of trees marked (by species)
13. Yield of timber in cube metres. (by species).
14. Yield of firewood (in metr ic tonnes)
15. Revenue realised.
16. Remarks.

Record of works.

Prescription of the working plan.—

1. Year.
2. Coupe number or locality.
3. Area in hectares.
4. Works prescribed.

Operations carried out.—

5. Year.
6. Coupe number or locality.
7. Area hectares.
8. Works done.
9. Expenditure incurred.
10. Remarks.

(b) Control book for the softwood and Pulpwood Plantation working Circle :—

Prescriptions of the working Plan.—

1. Year.
2. Name of felling series.
3. Coupe number.
4. Area in hectares.
5. System of felling.

Operations carried out .—

6. Year.

7. Name of felling series.

8. Coupe number.

9. Surveyed area of coupe in hectares.

10. Nature of felling.

11. Total yield.

12. Revenue realised per hectares.

13. Gross Revenue.

14. Particulars regarding reserved trees retained in the coupe (if any).

(c) **Control book for the Minor Forest Produce Worl ing Circle.**

Prescription of the Working Plan.

1. Year.

2. Name of produce.

3. Unit of lease.

4. Period of lease.

5. Method of working.

Operations carried out .—

6. Year.

7. Name of produce.

8. Unit of lease.

9. Period of lease.

10. Method of working.

11. Yield

12. Revenue realised.

13. Remarks

(d.) Control Book for the Section on Grazling.

Prescription of. the Working Plan .—

1. Year.

2. Area opened to grazing.

3. Area closed to grazing.

4. Localities closed to grazing.

5. Details of penning.

Operations carried out .—

6. Year.

7. Area opened to grazing.

8. Area closed to grazing.

9. Localities closed to grazing.

10. Number and descriptions of cattle grazed.

11. Revenue realised.

12. Grazing incidence per cow unit.

13. Name of penning.

14. Number of cattle licensed to penning.

15. Remarks.

(e). Control Forms for the Energy-wood Plantation Working circle.

Range :

Year :

Prescribed .—

Localitiy

Area in hectares.

Done .—

Locality.

Area in hectares.

Cost.

Remai ks.

B. Plantation Journal.

1. Sketch of plantation.

2. Year of formation range, series and reserved forests.

3. Details of nursery technique.

4. Details of preparatory works.

5. Details of planting or dibbling and after-care.

6. Notes of inspection.

7. Monthly record of expenditure (consisting the following columns).

Nursery expenditure.—

1. Year and month.
2. Preparation of beds and sewing.
3. Containers cost, cost filling and transport.
4. Watering, shifting replacement.

Preparatory works .—

5. Clearing.
6. Burning.
7. Uprooting.
8. Ploughing.
9. Aligning and staking.
10. Pitting.

Planting and maintenance .—

11. Planting including transport.
12. After-care.

(a) Annual expenditure.

Other items.—

13 (b) Yield obtained at rotation age.

(c) Revenue realised at rotation age.

14. Progressive total.

C. Control journal

1. Planting ..	..	Time, monsoon, method of dibbling the seeds, replacement of causualities mulching, soil working.
2. Seeds ..	..	Notes on collection of seeds, Difficulties encountered and suggestion.
3. Tractor ..	..	Notes in using the tractor for ploughing purposes. Difficulties encountered and suggestions.
4. Growth	..	Notes on density, crown development and height stocking mortality etc.,
5. Exploitation	..	Notes on markets demands, selling price etc., comments on yield per hectare.

(f). **RECORDS OF WORKS-MISCELLANEOUS.**

1. Year.
2. Working circle.
3. Nature of work.
4. Locality.
5. Area in hectares.
6. Working circle.
7. Nature of work.
8. Locality.
9. Area in hectares.
10. Cost of each item.
11. Total cost of each item.
12. Remarks.

APPENDIX—XXIV.

Register of Deviation.

1. Year.
2. Working circle
3. Range.
4. Prescription
5. Nature of deviations.
6. Reasons for deviations,
7. Remarks on any possible action to remedy the deviation.
8. Number and date of order sancting the deviations.

Govt. Branch Press, Madras-112.

C.No.RS.III/90416/88

Office of the Principal Chief
Conservator of Forests,
259, Anna Salai, Madras 600 006.
Dated 14.7.92.

THIRU M.HARIKRISHNAN, I.F.S.,
PRINCIPAL CHIEF CONSERVATOR OF FORESTS.

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13.	Conservator of Forests & Field Director, Project Tiger, Tirunelveli.	.. 1 set
14.	Conservator of Forests, Social Forestry, Salem	.. 1 set
15.	Conservator of Forests, Social Forestry, Trichy	.. 1 set
16.	Conservator of Forests, Social Forestry, Madurai	.. 1 set
17.	Conservator of Forests, Social Forestry, Tirunelveli	.. 1 set
18.	Principal, Southern Forest Rangers College, Coimbatore.	.. 1 set
19.	Principal, Tamil Nadu Forestry Training School, Vaigai Dam.	.. 1 set

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13.	Conservator of Forests & Field Director, Project Tiger, Tirunelveli	1
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